

**Guideline:** ED Management of Burn Wounds

Revised Date: April 2023

Review Date: April 2025

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**I. Purpose**

To guide the initial Emergency Department (ED) triage and treatment of burn patients.

**II. Population and Injury Characteristics**

This PMG applies to patients of all ages with burn injuries seen in the ED at VUH and VCH who do not otherwise qualify as a burn alert. Burn Alert Criteria are found in Appendix III.

**III. Burn Wound Assessment**

- a. Superficial (First Degree) Burns<sup>1</sup>: extend only into the epidermis and are not counted towards the percentage of total body surface area (%TBSA). These burns do not blister, they are red and painful (e.g. a sunburn) and heal in 3-4 days without scarring.
- b. Partial Thickness (Second Degree) Burns<sup>1</sup>: extend through epidermis and into the dermis. *Superficial partial thickness burns* extend only through the upper (papillary) dermis and will heal within 3 weeks with appropriate wound care and therapy. These burns are uniformly pink, moist, blanching, and painful. Superficial partial thickness burns are unlikely to result in scarring or functional deficits. *Deep partial thickness burns* extend into the deeper layers (reticular) of dermis and are white or mottled white/red/dark pink and typically dry, not as painful, and may not blanch. Deep partial thickness burns may heal on their own, but the risk of scarring and functional impairment is higher than with grafting in many cases.
- c. Full Thickness (Third Degree) Burns<sup>1</sup>: extend through the dermis and into subcutaneous fat. All of the skin appendages, reservoirs of skin which allows lesser burns to heal, have been injured and these burns will only minimally heal by epidermal migration. Therefore, full thickness burns need excision and grafting except for very small burns and burns in areas with excess skin.
- d. Burn Size Assessment:
  - i. Palmar Method<sup>2</sup>: 1% TBSA=the patient's palm from wrist crease to tip of longest finger (Figure 1, below).
  - i. Rule of 9s<sup>3</sup>: Divides the adult body into factors of 9 to estimate burn size. Children have larger heads and shorter legs so their heads and legs count as a different percentage. (Figure 2, below).

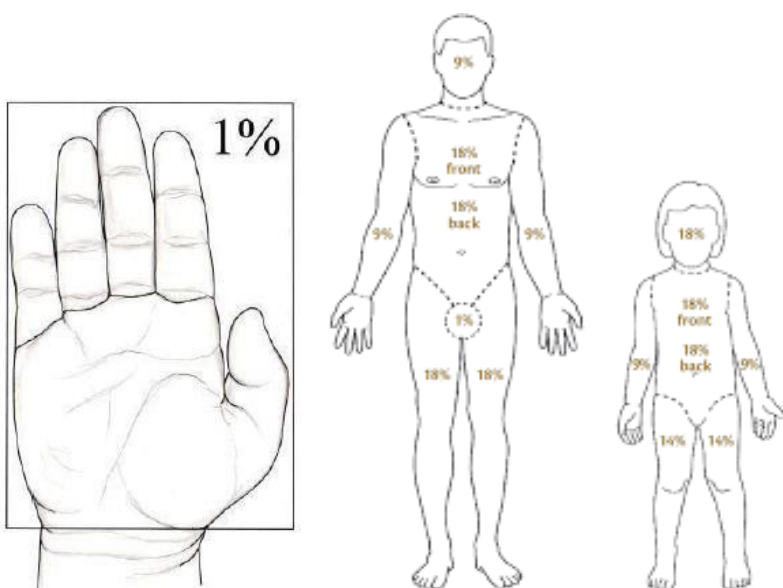


Figure 1.

Figure 2.

#### IV. Burn Wound Management

- a. Superficial (First Degree) Burns: Treat with soothing, creamy, non-fragranced lotion (e.g. Aveeno, Nivea, Jergens) and non-opioid analgesia. Reassure patient that the pain is expected and will improve rapidly. No burn consult required unless there are other concerns.
- b. Partial Thickness (Second Degree) Burns and Full Thickness (Third Degree) Burns: Consult the Burn Service\*. It is the goal of the burn service to respond to consults within 15 minutes\*. Ideally, patients presenting to Vanderbilt with a burn will be seen and evaluated by the burn team. However, if the burn is <1% TBSA partial thickness, a burn consult can be placed at the discretion of the ED attending. The patient should be set up with burn clinic follow up in the next 1-2 days.
  - i. Wound care: After evaluation, the burn team will make recommendations for treatment. If the patient is discharging home, they will need a prescription for both their topical antimicrobial and the wound care supplies. These supplies will need to last the patient until follow up.
  - ii. Follow up: The patient will be scheduled to follow up in the burn clinic within 3-5 days (depending on weekends and holidays), this request will be placed by the burn team.
  - iii. Pain Medications:
    1. Pain control in ED: Pain from small burns (<5%) can typically be managed with oral pain medications. After provider assessment, the patient should have acetaminophen 1000mg, ibuprofen 400mg, and oxycodone 5-10mg should be given so that the patient can undergo debridement when the burn team arrives.

Patients who have allergies or contraindications to any of those medications should not receive them. Larger burns are likely to be admitted, their pain should be controlled with the most appropriate regimen. These patients typically require a short-acting IV opioid for their debridement and initial wound care.

2. Pain control after discharge: Upon ED discharge, prescriptions are written by the ED team. Please ensure that the patient has enough pain medications to last them until clinic follow up. Opioid prescriptions that exceed 3 days or 180 morphine milligram equivalents should have the following language included on the prescription, “EXEMPT – Severe Burns” to be compliant with Tennessee law. See below for specific recommendations.
- c. Pain Control: Burns are painful. Patients require multimodal pain control to address the background, episodic, and neuropathic pain that burns cause. Everyone, unless there are contraindications, should be started on Acetaminophen scheduled for the first few days along with PRN Oxycodone for pain related to wound care or movement. Ibuprofen is indicated for patients without contraindications who have partial thickness burns, we avoid Ibuprofen in patients who may need an operation due to increased bleeding risk. We also recommend starting Gabapentin early to address neuropathic pain and reduce opioid use.<sup>4</sup> An example of a multimodal pain management regimen for an adult\* patient without contraindications would be the following:

Acetaminophen 500-1000mg PO q6hrs  
Ibuprofen 400mg PO q6hrs (avoid in patients with full thickness burns)  
Oxycodone 5mg PO q4hrs PRN + 30 minutes prior to shower/wound care  
Gabapentin 100mg PO TID

\*Pediatric patients should have a similar regimen appropriately dosed for their weight.

**V. Burn Therapy**

Burns in any location can result in functional deficits without constant use and attention to home exercise programs. Patients should be encouraged to continue to use burned upper extremities for all ADLs. Assistive devices should not be given, and patients should walk on burned legs/feet. Please see Appendix I for a list of links to instructional videos for each body location. These videos are available in English and Spanish. Home exercise programs should start the day of the injury.

**VI. Referral to the Burn Clinic at Vanderbilt**

Patients that are triaged in the ED during burn clinic hours (Monday through Friday, 8am-4pm) can be referred to the burn clinic for a same-day appointment rather than being checked in and seen in the ED. This allows faster throughput, offloads the ED, and allows the patient to be seen by specialists from our multidisciplinary team such as OT, PT, and social work. The triage pathway can be found in Appendix 2.

## VII. Appendix I: Burn Therapy Videos

Burns 202 Overview of Stretches

[https://www.youtube.com/watch?v=Q42sdcSqewk&list=PLFEMTIzjmLeUC-tONmpxadXa\\_7rusm\\_B6](https://www.youtube.com/watch?v=Q42sdcSqewk&list=PLFEMTIzjmLeUC-tONmpxadXa_7rusm_B6)

Burns 301 Pediatric Palm Stretch

[https://www.youtube.com/watch?v=MJmt8svllmo&list=PLFEMTIzjmLeUC-tONmpxadXa\\_7rusm\\_B6](https://www.youtube.com/watch?v=MJmt8svllmo&list=PLFEMTIzjmLeUC-tONmpxadXa_7rusm_B6)

Burns 302 Burn Hip and Groin Stretches [https://www.youtube.com/watch?v=53OE-kiRYyo&list=PLFEMTIzjmLeUC-tONmpxadXa\\_7rusm\\_B6](https://www.youtube.com/watch?v=53OE-kiRYyo&list=PLFEMTIzjmLeUC-tONmpxadXa_7rusm_B6)

Burns 303 Burn Elbow Stretch

[https://www.youtube.com/watch?v=InXlpAwAacA&list=PLFEMTIzjmLeUC-tONmpxadXa\\_7rusm\\_B6](https://www.youtube.com/watch?v=InXlpAwAacA&list=PLFEMTIzjmLeUC-tONmpxadXa_7rusm_B6)

Burns 304 Shoulder Burn Stretches

[https://www.youtube.com/watch?v=VsNvr9X0Ves&list=PLFEMTIzjmLeUC-tONmpxadXa\\_7rusm\\_B6](https://www.youtube.com/watch?v=VsNvr9X0Ves&list=PLFEMTIzjmLeUC-tONmpxadXa_7rusm_B6)

Burns 305 Foot and Leg Stretches

[https://www.youtube.com/watch?v=1\\_8FWOd7f3I&list=PLFEMTIzjmLeUC-tONmpxadXa\\_7rusm\\_B6](https://www.youtube.com/watch?v=1_8FWOd7f3I&list=PLFEMTIzjmLeUC-tONmpxadXa_7rusm_B6)

Burns 306 Burn Hand Stretches

[https://www.youtube.com/watch?v=VPCN6XZ3P5M&list=PLFEMTIzjmLeUC-tONmpxadXa\\_7rusm\\_B6](https://www.youtube.com/watch?v=VPCN6XZ3P5M&list=PLFEMTIzjmLeUC-tONmpxadXa_7rusm_B6)

Burns 307 Burn Wrist Stretches

[https://www.youtube.com/watch?v=MJ6F\\_F6BsR8&list=PLFEMTIzjmLeUC-tONmpxadXa\\_7rusm\\_B6](https://www.youtube.com/watch?v=MJ6F_F6BsR8&list=PLFEMTIzjmLeUC-tONmpxadXa_7rusm_B6)

Burns 308 Burn Neck Stretches

[https://www.youtube.com/watch?v=eKg\\_m\\_BkJD4&list=PLFEMTIzjmLeUC-tONmpxadXa\\_7rusm\\_B6](https://www.youtube.com/watch?v=eKg_m_BkJD4&list=PLFEMTIzjmLeUC-tONmpxadXa_7rusm_B6)

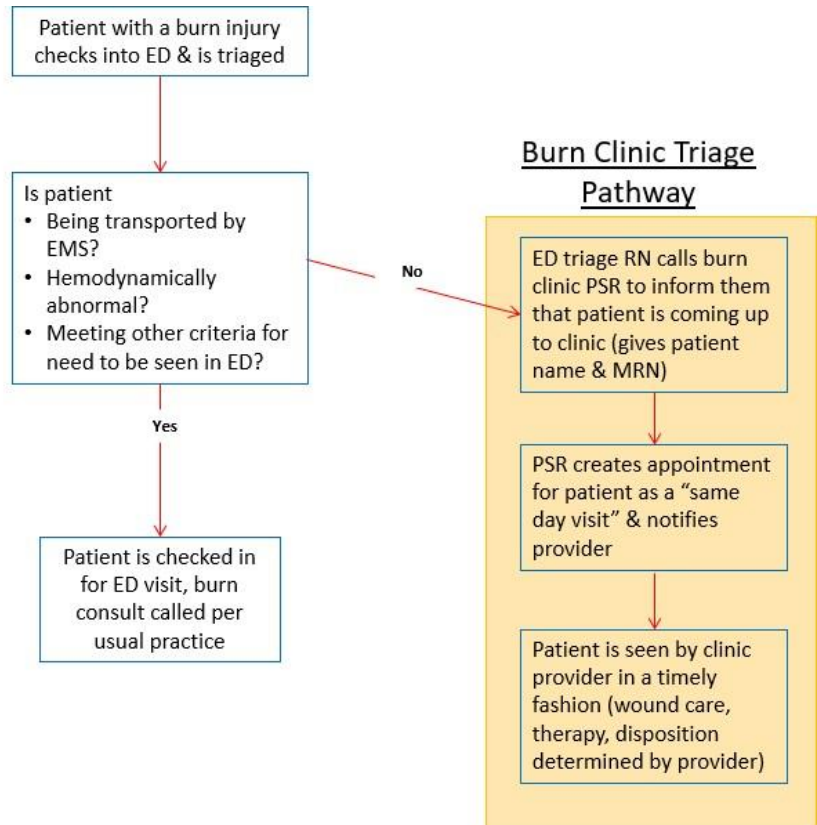
Burns 309 Face Stretching

[https://www.youtube.com/watch?v=rYAziBODWho&list=PLFEMTIzjmLeUC-tONmpxadXa\\_7rusm\\_B6](https://www.youtube.com/watch?v=rYAziBODWho&list=PLFEMTIzjmLeUC-tONmpxadXa_7rusm_B6)

### VIII. Appendix II: ED to Burn Clinic Triage

Triage pathway only available during clinic hours: **Monday-Friday, 8am to 4pm**

**Contact numbers for burn clinic:**  
PSR (front desk) **6-5151**  
If no answer, clinic RN direct line 3-5239



IX. Appendix III: Burn Alert Criteria

## Vanderbilt Adult Emergency Medicine Burn Alert Criteria

### Burn Alert Level I

- $\geq 20\%$  total body surface area (TBSA) full/partial thickness burns without concurrent trauma
- Any intubated burn patient or burn patient with unstable/unsecure airway
- High voltage electrical ( $>$  household voltage 240) or lightning injuries
- Chemical burns that involve  $>20\%$  TBSA (Hydrofluoric acid injuries  $> 1\%$  TBSA)
- Extremities: frozen or thawed within the last 24 hours, and body temp: moderate (core body temp  $30-34^{\circ}\text{C}/86-93^{\circ}\text{F}$ ) to severe (core body temp  $<30^{\circ}\text{C}/<86^{\circ}\text{F}$ ) hypothermia

### Burn Alert Level II

- 5-19% total body surface area (TBSA) of partial and/or full thickness (2<sup>nd</sup> and 3<sup>rd</sup> degree) burns
- Non-intubated inhalation injuries, including chemical inhalation
- Low voltage electrical ( $\leq$  household voltage 240) with burn injury or neuropathy
- Chemical burns  $<20\%$  TBSA (Hydrofluoric acid injuries  $< 1\%$  TBSA)
- Extremities: frozen or thawed within the last 24 hours, and body temp: mild hypothermia (core body temp  $34-35.9^{\circ}\text{C}$ )

All leveled burns should be 2<sup>nd</sup> or 3<sup>rd</sup> degree (partial or full thickness). First degree burns should not be leveled.

### Burn Consult

- Any burn injury not meeting burn alert criteria
- Frostbite injury thawed extremities  $>24$  hours
- Soft tissue disorders or injuries such as TENs, SJS, soft tissue degloving, and crush injury
- Hydrofluoric acid  $<5$  minutes

### SPECIAL CONSIDERATIONS

- Emergency Medicine, Trauma or Burn Attendings ONLY may up/downgrade patients
- Residents, Fellows, and ED staff DO NOT level patients
- LightFlight flight crew will level their patients
- Unless requested by an EM Attending, the Communications Center personnel will assign a level



## Vanderbilt Peds Emergency Medicine Burn Alert Criteria

### **Burn Alert Level I**

- $\geq 15\%$  total body surface area (TBSA) full/partial thickness burns without concurrent trauma
- Any intubated burn patient or burn patient with unstable/unsecure airway
- High voltage electrical ( $>$  household voltage 240) or lightning injuries
- Chemical burns that involve  $>15\%$  TBSA (Hydrofluoric acid injuries  $> 1\%$  TBSA)
- Extremities: frozen or thawed within the last 24 hours, and body temp: moderate (core body temp  $30-34^{\circ}\text{C}/86-93^{\circ}\text{F}$ ) to severe (core body temp  $<30^{\circ}\text{C}/<86^{\circ}\text{F}$ ) hypothermia

### **Burn Alert Level II**

- 5-19% total body surface area (TBSA) of partial and/or full thickness (2<sup>nd</sup> and 3<sup>rd</sup> degree) burns
- Non-intubated inhalation injuries, including chemical inhalation
- Low voltage electrical ( $\leq$  household voltage 240) with burn injury or neuropathy
- Chemical burns  $<15\%$  TBSA (Hydrofluoric acid injuries  $< 1\%$  TBSA)
- Extremities: frozen or thawed within the last 24 hours, and body temp: mild hypothermia (core body temp  $34-35.9^{\circ}\text{C}$ )

All leveled burns should be 2<sup>nd</sup> or 3<sup>rd</sup> degree (partial or full thickness). First degree burns should not be leveled.

### **Burn Consult**

- Any burn injury not meeting burn alert criteria
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## X. References

1. Giavonni M. Lewis, D. M. H., Nicole S. Gibran. in *Total Burn Care* (ed David N.Herndon) Ch. 10, 125-130 (W.B. Saunders, 2012).
2. Kirby NG, B. G. Vol. 3rd Edition 85 (HMSO, London, 1981).
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4. Gray, P., Williams, B. & Cramond, T. Successful use of gabapentin in acute pain management following burn injury: a case series. *Pain medicine (Malden,Mass.)* **9**, 371-376, doi:10.1111/j.1526-4637.2006.00149.x (2008).