VANDERBILT UNIVERSITY MEDICAL CENTER

Guideline: ED Management of Burn Wounds

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I. Purpose

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

II. Population and Injury Characteristics

This PMG applies to patients of all ages with burn injuries seen in the ED at VUH 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[1]: 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[1]: 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[1]: 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. Palmer Method[2]: 1% TBSA=the patient's palm from wrist crease to tip of longest finger (Figure 1, below).

   ii. Rule of 9s[3]: 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).

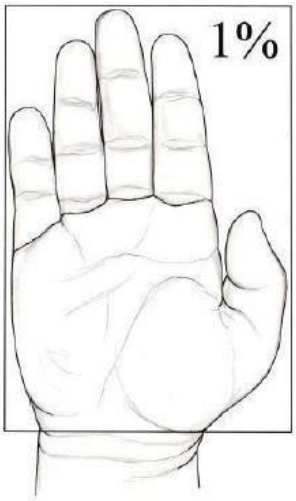


Figure 1.

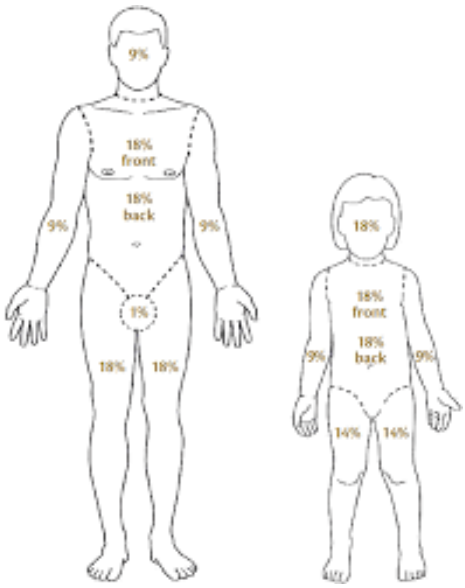


Figure 2.

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. All 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, all 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 a 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 may need a prescription for both their topical antimicrobial and the wound care supplies. These supplies will need to last the patient until Burn Clinic 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 (<5-10% TBSA) can typically be managed with oral pain medications. After ED provider assessment, the patient should have acetaminophen 1000 mg, ibuprofen 800 mg, and oxycodone 5-10 mg given (unless contraindicated based on the patient's medical history) so that the patient can undergo debridement when the burn team arrives.

Larger burns (>10% TBSA) 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. If the patient is being admitted and their is a bed available the wound debridement may take place in the Burn Unit, rather than delaying transfer out of the ED.

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 scheduled Ibuprofen and Acetaminophen for the first few days along with PRN Oxycodone for pain related to wound care or movement. An example of a multimodal pain management regimen for an adult* patient without contraindications would be the following:

Acetaminophen 500-1000mg PO q6hrs
Ibuprofen 800 mg PO q8hrs
Oxycodone 5mg PO q4hrs PRN + 30 minutes prior to shower/wound care

*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 instructionalvideos 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 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. Firefighters and First Responders

All firefighters and first responders take priority when they come into the ED when injured on the job, regardless of the depth and size of injury. The Burn Service should be consulted on all patients as a Burn Consult, unless they meet criteria for a Burn Level 1 or Burn Level 2. Additionally, all patients in this category require a clinic appointment – to be scheduled before discharge from the ED – for return-to-work purposes.

VIII. Appendix I: Burn Therapy Videos

Burns 202 Overview of Stretches
https://www.youtube.com/watch?v=Q42sdcSqewk&list=PLFEMTIzjmLeUC-tONmpxadXa_7rusm_B6

Burns 301 Pediatric Palm Stretch
https://www.youtube.com/watch?v=MJmt8svIlmo&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

Burns 303 Burn Elbow Stretch
https://www.youtube.com/watch?v=InXIpAwAacA&list=PLFEMTIzjmLeUC-tONmpxadXa_7rusm_B6

Burns 304 Shoulder Burn Stretches
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

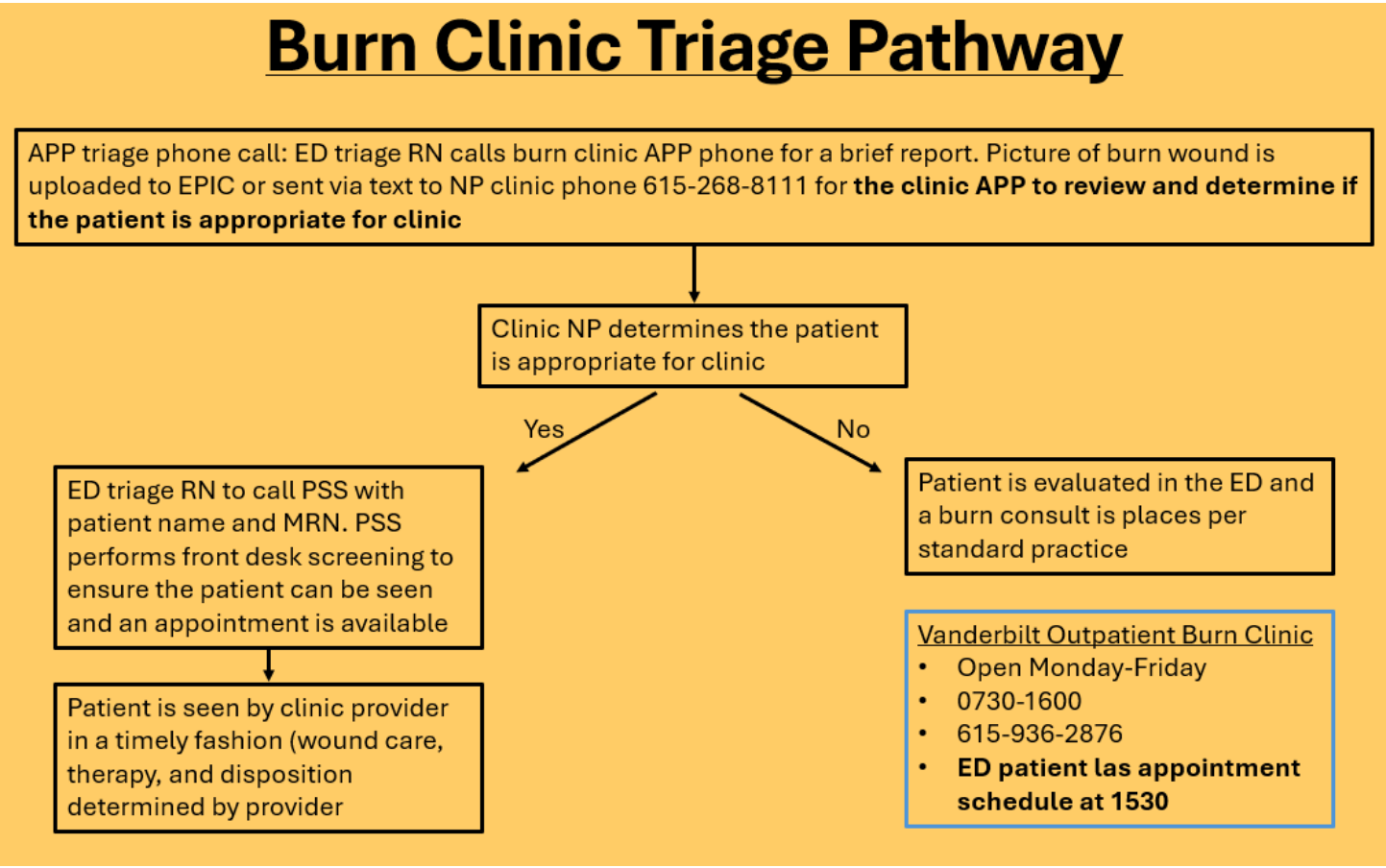
Burns 306 Burn Hand Stretches
https://www.youtube.com/watch?v=VPCN6XZ3P5M&list=PLFEMTIzjmLeUC-tONmpxadXa_7rusm_B6

Burns 307 Burn Wrist Stretches
https://www.youtube.com/watch?v=MJ6F_F6BsR8&list=PLFEMTIzjmLeUC-tONmpxadXa_7rusm_B6

Burns 308 Burn Neck Stretches
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

IX. Appendix II: ED to Burn Clinic Triage



X. Appendix III: Burn Alert Criteria

Vanderbilt Adult Emergency Medicine Burn Alert Criteria

Burn Alert Level I

- ≥ 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 lightening 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 30-34ºC/86-93ºF) to severe (core body temp <30ºC/<86ºF) hypothermia

Burn Alert Level II

- 5-19% total body surface area (TBSA) of partial and/or full thickness (2nd and 3rd degree) burns
- Non-intubated inhalation injuries, including chemical inhalation
- Low voltage electrical (</= 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 34-35.9ºC)

All leveled burns should be 2nd or 3rd 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
- Firefighters with burn injuries sustained on the job

SPECIAL CONSIDERATIONS

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

	Level I Burn Activation	Level II Burn Activation
Personnel Response	• Burn Attending • EM Attending • EM Resident • Surgery Resident • Primary Nurse • Secondary Nurse/Paramedic • Respiratory Therapist • Radiology Technician • ED Pharmacist • Social Worker • ED Charge Nurse	• Burn Attending • EM Attending • EM Resident • Surgery Resident • Primary Nurse • Secondary Nurse/Paramedic • Respiratory Therapist • Radiology Technician • ED Pharmacist • Social Worker • ED Charge Nurse
Sequential/Standard Management Flow?	Yes	Yes
Team members wear PPE?	Yes	Yes
Video Recording?	Yes	Yes

XI. 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).
3. Moore, R. A., Waheed, A. & Burns, B. in *StatPearls* (StatPearls Publishing StatPearls Publishing LLC., 2019).
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).