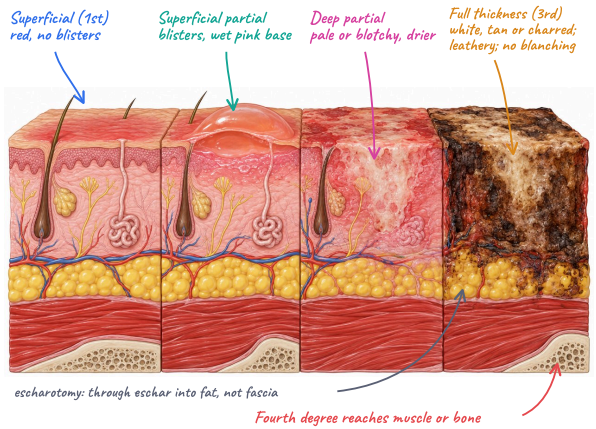
ER BASICS · ONE-PAGER

Burns

Burn depth, TBSA, fluid resuscitation, inhalation injury, special burns and ABA referral criteria for exam review

19 sources + more detail
erbasics.com/sheets/burns.html
checked Oct 2026

ANATOMY Burn depth



1 Burn depth and first care

Fourth degree reaches muscle or bone.

DEPTH	LOOK AND FEEL	HEALING
Superficial (1st)	Red, tender, no blisters	Quickly, no scar
Superficial partial (2nd)	Blisters on a wet pink base; blanches; very painful	1 to 2 weeks; little scarring
Deep partial (2nd)	Pale or blotchy, drier; slow or no blanching; less pain	Over 2 weeks; often grafted
Full thickness (3rd)	White, tan or charred; leathery; no blanching; numb	Excision and grafting

⚠ SAFETY Stop the burning; remove rings and jewelry early. Cool small burns under running water for about 20 minutes, never ice. Keep large burns covered, dry and warm.

- Pain: IV opioids, not IM. Tetanus prophylaxis.
- Large burns: expect an NG tube for ileus.

2 Estimating TBSA

Rule of nines. Count partial and full thickness only, not red unblistered skin.

AREA	ADULT	INFANT
Head and neck	9%	18%
Each arm	9%	9%
Trunk, front or back	18% each	18% each
Each leg	18%	14%
Perineum	1%	Not separate

- Patchy burns: the patient's palm with fingers is about 1%.
- Lund-Browder is most accurate for children.

3 Fluid resuscitation

- Before TBSA is known (ABLS): LR 125 mL/h (age 5 or under), 250 (6 to 13), 500 (14 and up).
- Adults, 20% TBSA or more: 2 mL × kg × %TBSA (ABLS since 2011, ABA 2024). Parkland's 4 mL is the classic exam formula.
- Children: 3 mL × kg × %TBSA, plus maintenance D5LR if under 30 kg. Electrical: 4 mL.
- Half in the first 8 h from the burn, half over 16 h; titrate hourly to urine output. No boluses unless hypotensive.

PATIENT	URINE OUTPUT GOAL
Adult	0.5 mL/kg/h (about 30 to 50 mL/h)
Child under 30 kg	1 mL/kg/h
Adult, high voltage, dark urine	75 to 100 mL/h until clear

EXAM TIP Count from the burn and subtract fluid already given. 80 kg, 50%, burned 0800, arrives 1000 with 500 mL in: 2 × 80 × 50 = 8,000 mL; half minus 500 = 3,500 mL by 1600, about 583 mL/h (Parkland: about 1,250 mL/h).

⚠ SAFETY Fluid creep causes compartment syndromes (abdomen, limbs, eyes) and pulmonary edema. Typical adult ranges for exam study; follow your institution's or agency's protocols.

4 Inhalation injury, CO and cyanide

- Clues: enclosed space, facial burns, singed nasal hair, soot, hoarseness, stridor.
- Edema worsens with fluids: expect early intubation for stridor, voice change, deep face or neck burns; 8.0 tube or larger in adults.
- CO: 100% O2. COHb half-life about 4 to 6 h on room air, 1 h on 100% O2, 20 to 40 min hyperbaric.
- Hyperbaric O2: consider for loss of consciousness, neuro deficits, cardiac ischemia, severe acidosis or COHb over 25%.
- Cyanide (plastics, foam): altered mental status, seizures, hypotension, lactate over 8 mmol/L.
- Hydroxocobalamin 5 g IV over 15 min, may repeat once; own line; red skin and urine. Follow your institution's or agency's protocols.
- Avoid nitrites with CO: methemoglobin worsens hypoxia.

⚠ SAFETY SpO2 counts COHb as oxyhemoglobin and can look normal in CO poisoning: check COHb by co-oximetry.

5 Circumferential burns and escharotomy

- Limbs: circumferential eschar acts as a tourniquet. Elevate; check Doppler pulses hourly. Fading pulses without hypovolemia call for escharotomy.
- Chest: poor chest rise or rising airway pressures call for chest escharotomy.
- The cut goes through eschar into fat, not fascia. The need usually appears within 48 h.

EXAM TIP Escharotomy frees the skin. Muscle swelling after electrical injury needs fasciotomy.

6 Electrical and chemical burns

- Electrical (high voltage is 1,000 V or more): small skin wounds hide deep muscle damage.
- Monitor ECG: VF or asystole can occur at once. Watch for dark urine (rhabdomyolysis), high potassium, compartment syndrome.
- Lightning: reverse triage. Treat those without pulse or breathing first; many survive.
- Chemical: PPE, remove clothing, brush off powder, flush with water at least 20 minutes after it seems gone. Do not neutralize.
- Alkalis (liquefactive necrosis) penetrate deeper than acids (coagulation). Eyes: irrigate until pH is normal.
- Hydrofluoric acid: pain out of proportion, often delayed. Calcium gluconate gel; watch calcium, magnesium, potassium and QT.

7 Burn center referral (ABA)

Immediate consultation, transfer considered:

- Full thickness, any size
- Partial thickness 10% TBSA or more
- Deep partial or full thickness: face, hands, feet, genitalia, perineum, joints
- Inhalation, chemical, high-voltage or lightning injury
- Comorbidities, other trauma, poorly controlled pain
- Children 14 or under, or under 30 kg: all may benefit

Consult for partial thickness under 10%, possibly deep burns, possible inhalation and low-voltage injury.

⚠ SAFETY Suspect abuse: immersion scalds with sharp margins, symmetry, glove or stocking pattern and even depth; punched-out cigarette burns.

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