Burn Review

Nursing 202

Burn Review

- The # of burn fatalities in the U.S. has declined dramatically, to about 4,000 a year
- Estimated 500,000 burns treated/year
- Now, people with burns covering 90% of their bodies can survive.
  - Although they will often have permanent impairment

Types of Burns

- Thermal
- Chemical
  - **copious amounts of continuous flushing with water to area of exposure**
- Smoke and Inhalation
  - **Respiratory distress**
- Electrical
  - **Causes deep tissue & muscle damage**
  - **Internal damage not readily apparent**
- Cold Thermal Injury


Second Degree Burn
©The Wound Doctor

A

Fig. 25-2. Electrical injury produces heat coagulation of blood supply and contact area as electric current passes through the skin. **A,** Hand.

Phases of Burn Management

*Pre - Hospital Care

*Emergent (Resuscitative) Phase

*Acute Phase

* Rehabilitative Phase

Pre Hospital Care

A

B

C

cool!

Need an airway immediately!!

No Ice

No creams, butter, ointments

Classification of Burn Injury

- In the past, burns were defined by degrees:
  - First-degree burn
  - Second-degree burn
  - Third-degree burn

Classification of Burn Injury

- The ABA now advocates categorizing the burn according to depth of tissue destruction:
  - Partial thickness burn
  - Full thickness burn

Classification of Burn Injury

- Superficial partial-thickness burn (1st)
  - Involves the epidermis
  - Superficial, red
  - i.e. sunburn, heat flash
- Deep partial-thickness burn (2nd)
  - Involves the dermis
  - Red, blistered, swollen, shiny, wet appearance
  - i.e. flame, scald, chemical
- Full-thickness burn (3rd)
  - Involves fat, muscle, bone; **destruction of entire dermis**
  - Whitish, charred or translucent, no pin prick sensation
  - i.e. flame, scald, electrical, chemical, tar

Burn Center Referral Criteria

- Deep Partial Thickness (2nd degree burn) = any age, BSA of 10%
- Full Thicknes (3rd degree burn) = any age, any BSA
- All Patients who have:
  - Burns to face, feet, hands, perineum or joints
  - Electrical injury
  - Chemical or Inhalation injury
  - Associated injuries or comorbidities (trauma)
  - Children or those with special needs
  - Suspected abuse

Emergent Phase (Resuscitative)

- **Airway**
- **Maintain body temperature**
- **Goal: prevent shock (typically hypovolemic)**
- **<u>Fluid Replacement: Lactated Ringers</u>**

Parkland Formula (Consensus Formula):

(2ml X body weight (Kg) X % of burn)= 24 hour total fluid need

-Give first 1/2 in 1st 8 hours

**Fluid resuscitation begins with BSA > 10%*

Parkland Formula Example

- How many milliliters of fluid does a 160 pound male with 30% BSA of burns require?

- **(2 ml X body weight (kg) X % of burn)=**

  24 hour total fluid need

- **Give half in first 8 hours**

Answer

- 160/2.2= 72.7 kg
- 72.7 kg * 2 ml= 145.4
- 145.4 * 30= 4362 ml/ 24 hours

- Half in first 8 hours = 4362/2= 2181 ml
- 2181 ml/ 8 hrs= 273 ml/hr

Emergent Phase

- Usually lasts 24 to 48 hours
- Phase begins with fluid loss and edema formation and continues until fluid mobilization and diuresis begin

Acute Phase (Wound Healing)
after the first 48 hours to healing

- Fluid replacement
- Management of complications
    - Infection & Sepsis!
- Physical Therapy
- Wound Care
- Excision and Grafting

Acute Phase
after the first 48 hours to healing

- Necrotic tissue begins to slough
- Formation of granulation tissue
- A partial-thickness burn wound will heal from the edges
- Full-thickness burn wounds must be covered with skin grafts

Pathophysiology

- Fluid and electrolyte shifts
  - Plasma leakage = increased interstitial volume
  - Decreased blood volume
  - **Increased Hct**
  - Decreased systolic B/P
- Inflammation and Healing
- Immunologic Changes

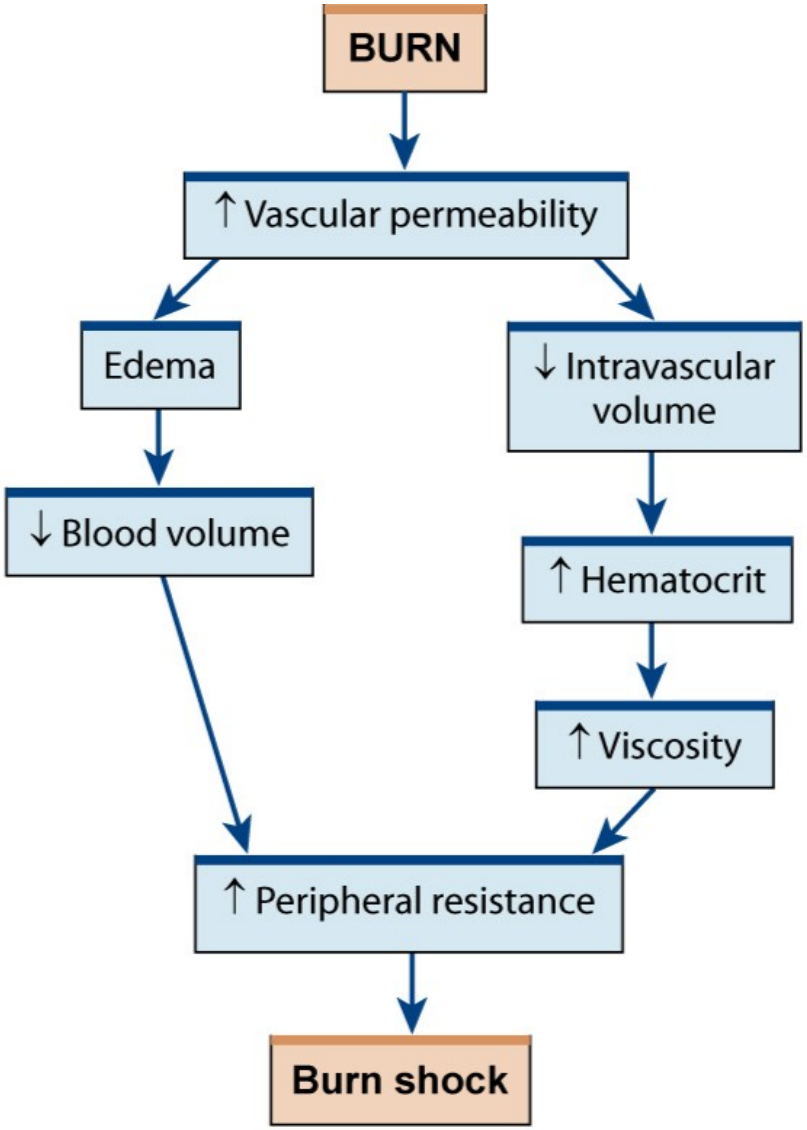
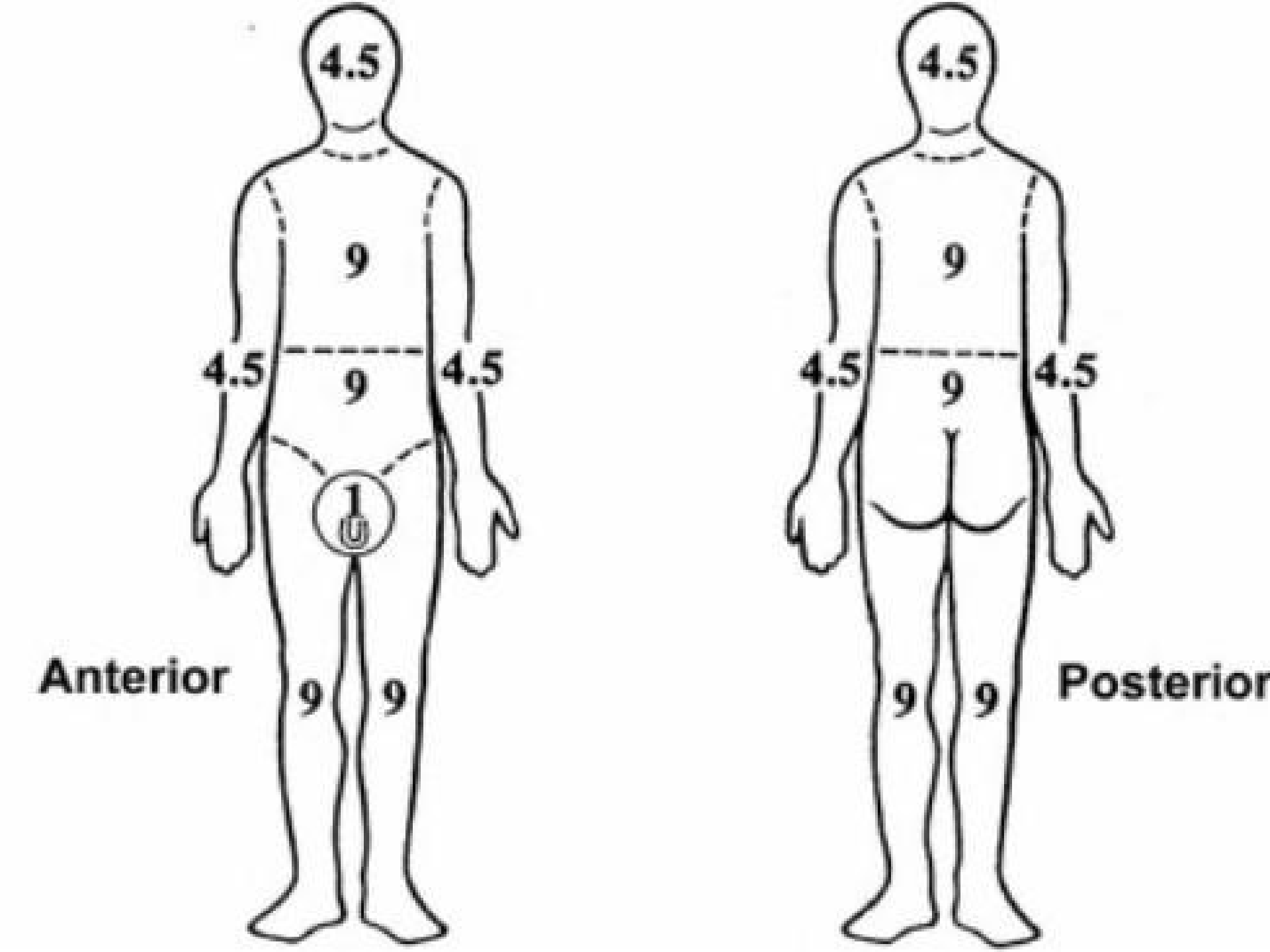


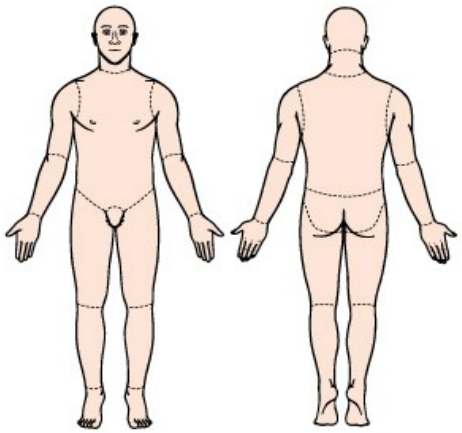
Fig. 25-5. At the time of major burn injury, there is increased capillary permeability. All fluid components of the blood begin to leak into the interstitium, causing edema and a decreased blood volume. The red blood cells and white blood cells do not leak. Therefore the hematocrit increases and the blood becomes more viscous. The combination of decreased blood volume and increased viscosity produces increased peripheral resistance. Burn shock, a type of hypovolemic shock, rapidly ensues and continues for about 24 to 48 hours.

Assessment

- Rule of 9’s
  - Considered adequate for initial assessment of adult patients
- Palmer method
  - Patient’s palm = 1% BSA
- Lund and Browder Chart (Berkow Method)
  - Considered more accurate
  - Considers pt’s age

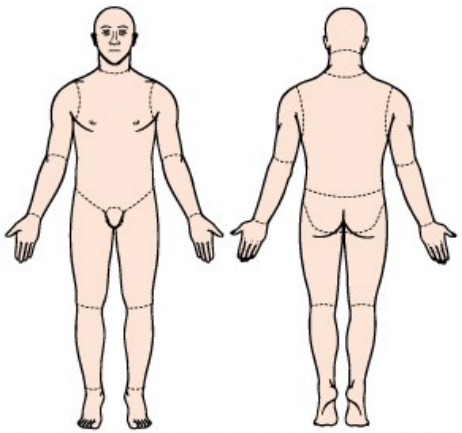

4.5
9
4.5
9
4.5
1
9
9
Anterior
4.5
9
4.5
9
9
Posterior

Head	7
Neck	2
Ant. trunk	13
Post. trunk	13
R. buttock	2 1/2
L. buttock	2 1/2
Genitalia	1
R.U. arm	4
L.U. arm	4
R.L. arm	3
L.L. arm	3
R. hand	2 1/2
L. hand	2 1/2
R. thigh	9 1/2
L. thigh	9 1/2
R. leg	7
L. leg	7
R. foot	3 1/2
L. foot	3 1/2
TOTAL	100%



A

Head & neck	9%
Arms (each)	9%
Ant. trunk	18%
Post. trunk	18%
Legs (each)	18%
Perineum	1%
TOTAL	100%

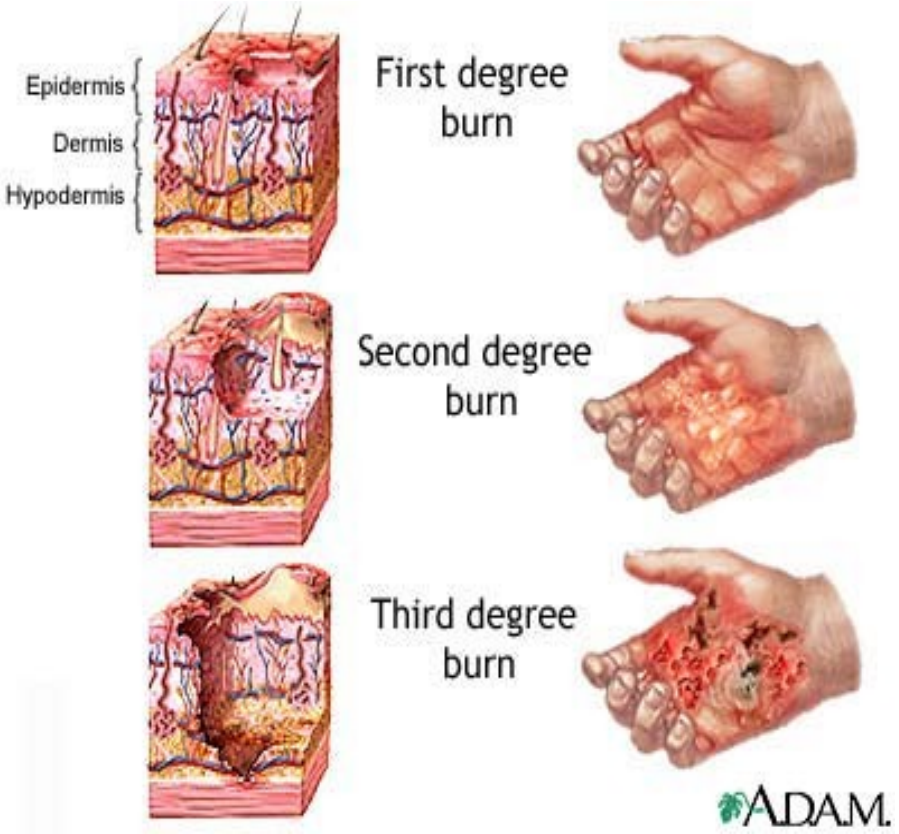


B

Fig. 25-4. **A,** Lund-Browder chart. By convention, areas of partial-thickness injury are colored in blue and areas of full-thickness injury in red. Superficial partial-thickness burns are not calculated. **B,** Rule of nines chart.

Assessment

- **Burns of the face**
  - Laryngeal
  - Smoke inhalation
  - These patients need to be intubated!
- **Depth of the Burn**
  - Deep partial thickness (2ndº)
    - **Red, shiny, wet appearing**
  - Full thickness (3rdº)
    - **Destruction of entire dermis!**



Complications

- **Most at Risk for Infection!**
- Cardiovascular
- Respiratory
  - May need an escharotomy
- Renal
  - Maintain U/O 50-100ml/hour
  - 100ml/hour for electrical burns
  - ↓ UO because of ↓ blood volume
- Gastrointestinal (Common)
  - Paralytic ileus

Neurovascular and Respiratory Compromise

- Worry about circumferential extremity and trunk burns.
- May need an Escharotomy
  - Performed on full thickness burns
  - Ideally done in the Burn Center
- Fasciotomy
  - Release the muscle fascia / RARE!

Fig. 25-7. Escharotomy of the lower extremity.

Wound Coverage

- Allograft = cadaver skin
  - *this is the gold standard.
- Xenograft = animal tissue (pigskin)
- Biobrane = biosynthetic material embedded with collagen
  - Good because it can be done outpatient

Wound Coverage

- Cultured Epithelial Autografts
  - Grown from biopsies obtained from the patient’s own skin
  - Used in patient’s with a large body surface area burn or those with limited skin for harvesting

A

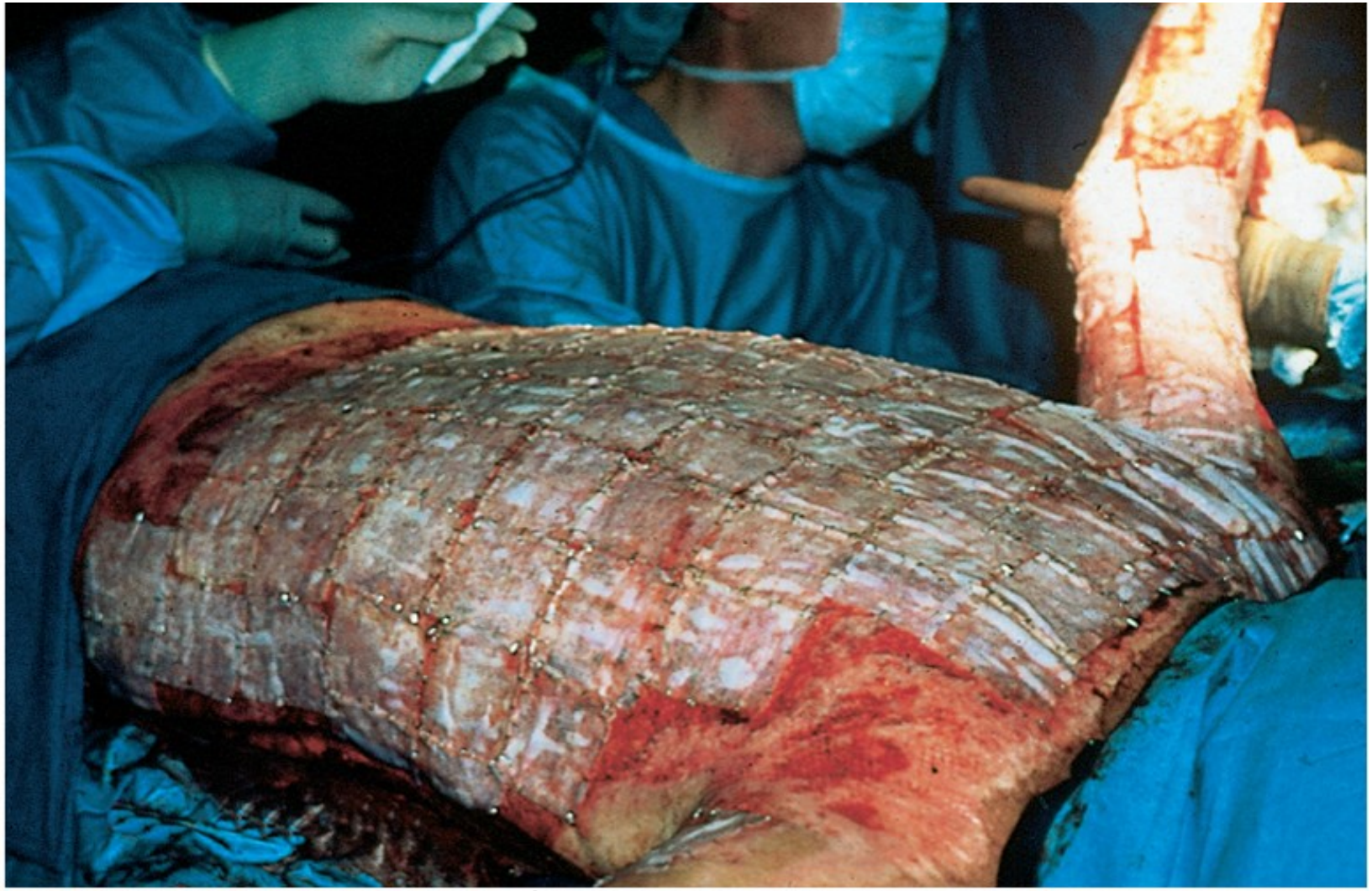
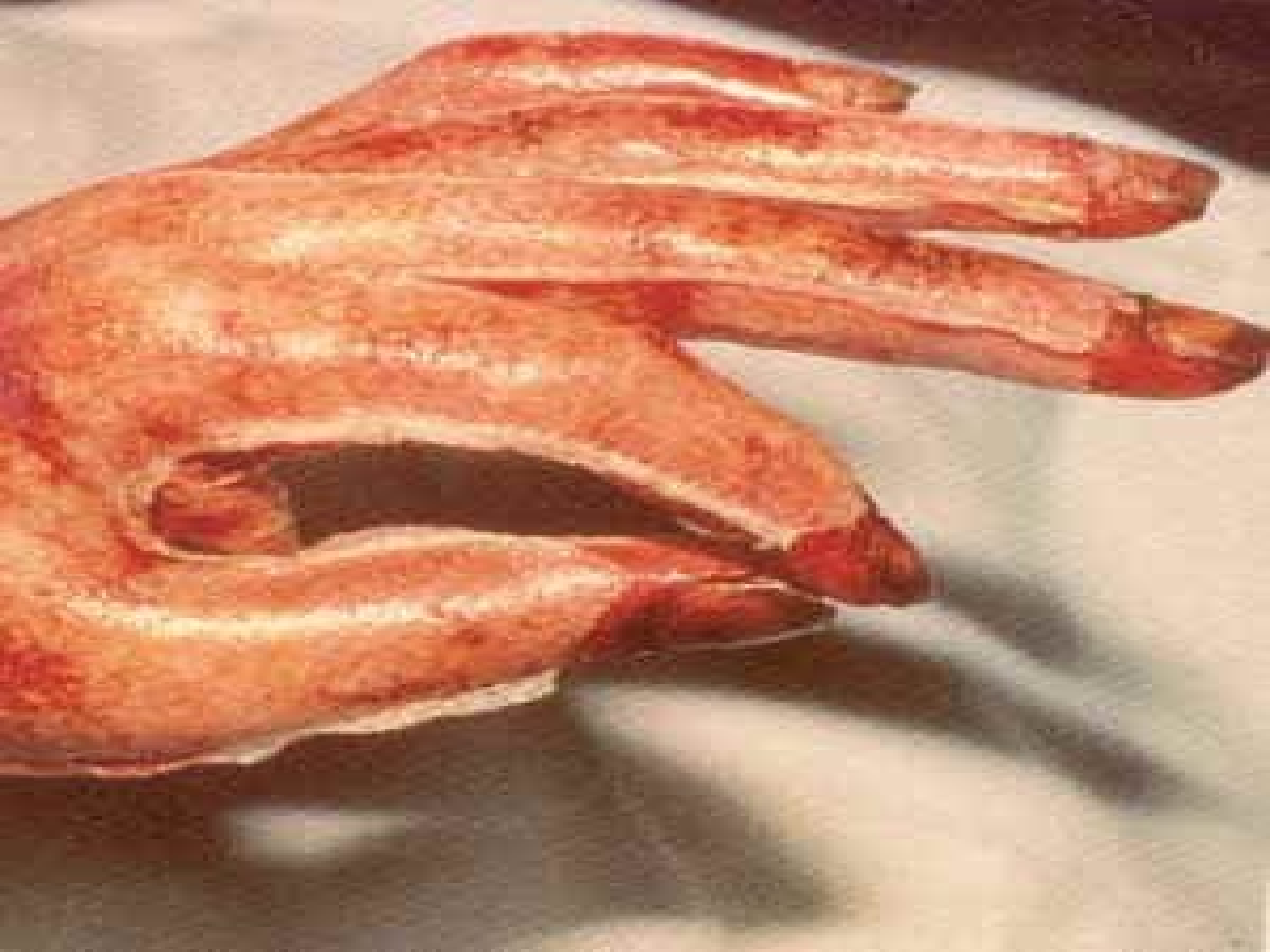


Fig. 25-12. Patient with cultured epithelial autograft (CEA). **A,** Intraoperative application of cultured epithelial autograft.

Application of Biobrane



Biobrane Removal

Wound Coverage

- Transcyte = skin cells harvested from newborn foreskin
  - Good for partial thickness wounds
  - $$$$$
- Integra = artificial skin with a dermal layer made of collagen and epidermal layer of silicone.
  - This will grow with the patient so it’s good for joints.

Scar Management

- Need early excision and grafting
- Want them in a position of function.
- Exercise and recondition
- May need pressure garments
- Skin needs to be lubricated because they no longer have oil glands.
- May be hypersensitive to temperature changes.

Meeting Needs

- Pain Management
  - IV (usually Morphine is your #1 choice)
  - **Peripheral perfusion is poor**
- Pharmocological Tx: Multimodal
  - Opiods
  - Sustained release meds
  - Anxiolytics (Xanax, Vistaril)
  - NSAIDS
  - PCA
  - Sedation

Meeting Needs

- Pain Management
  - Non-Pharmocological
    - Distraction
    - Hypnosis
    - Music
    - Relaxation techniques
      - Meditation

Meeting Needs

- **Nutrition**
  - Increase proteins
  - Increase calories
  - TPN & PEG Tubes
  - Resting metabolic expenditure may be ↑ by 50-100% above normal
  - Core temperature is elevated
  - Caloric needs are about 5000 kcal/day

Meeting Needs

- Emotional/Psychological
  - PTSD & Disfigurement
  - Social worker, nursing staff, & pastoral care all involved
  - Prepare family for what they will initially see
- Rehabilitation
  - Protect healed areas from sunlight for 1 year
  - Hypertrophic scarring
  - Skin & joint contractures are the most common complication in the rehab phase!
  - Long term!