



مدیریت زخمهای سوختگی

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اهداف

- تعریف سوختگی و عوامل دخیل در آن
- بحث در مورد پاتوفیزیولوژی سوختگی
- درمان های مناسب در بیماران سوختگی
- پانسمانهای مناسب در بیماران سوختگی

سوختگی چیست؟

- آسیب پوستی ناشی از گرما، برق ، مواد شیمیایی، اصطکاک یا تشعشع.





میزان بروز آسیب های سوختگی

- به طور کلی، میزان بروز آسیب دیدگی در سوختگی و همچنین بستری شدن در بیمارستان و مرگ و میر کاهش یافته است.
- با این حال، سالانه در ایالات متحده: تقریباً ۱ میلیون نفر به دلیل آسیب های ناشی از سوختگی نیاز به مراقبت پزشکی دارند.
- ۷۰۰۰۰۰ پذیرش اورژانس که ۴۵،۰۰۰ نفر در بیمارستان بستری می شوند.
- مرگ و میر ناشی از صدمات ناشی از استنشاق سوختگی / دود ۴۵۰۰ مرگ و میر در سال است.
- بیشتر آسیب های ناشی از سوختگی در خانه رخ می دهد
- ۷۵٪ از موارد سوختگی توسط خود فرد ایجاد شده است.
- جمعیت در معرض خطر: کودکان و سالمندان

بیماران خاص

در بیماران کودک

- پوست نازک تر است مستعد آسیب دیدگی شدید هستند
- نسبت سطح / وزن بدن بیشتر است
- اتلفات مایعات بدن بر اثر تبخیر بیشتر ← هیپوولمی
- اتلفات سریع گرما ← هیپوترمی
- ذخیره سوخت و ساز بدن را کاهش دهید.
- مستعد افت قند خون
- راههای هوایی کوچک ... ایمن سازی آن دشوارتر است
- پاسخ ایمنولوژیک نابالغ ← سپسیس
- احتمال سو استفاده / غفلت را در نظر بگیرید

بیماران خاص

بیماران سالمند

- پوست نازک تر است در نتیجه مستعد آسیب دیدگی شدیدتر هستند.
- کاهش تحرک، زمان واکنش، بینایی و شنوایی و احساس در دست و پا در سالمندان وجود دارد.
- قادر به فرار نیستند و یا قادر به تشخیص شدت حرارت نیستند
- دارای بیماریهای زمینه ای هستند مانند بیماریهای عروقی، قلبی و دیابتی
- احتمال بیشتری برای ایجاد عوارض وجود دارد.
- پاسخ ایمنولوژیک ضعیف ← سپسیس
- احتمال سوء استفاده / بی توجهی را در نظر بگیرید



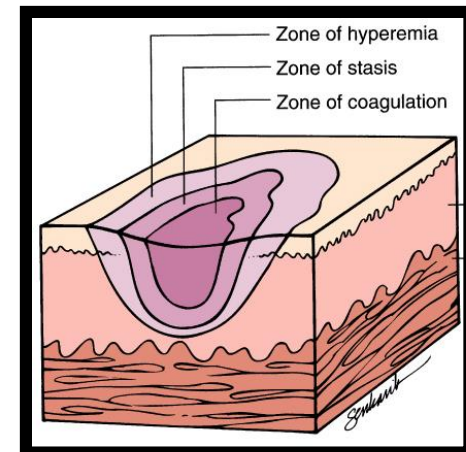
Abuse & Burn Injuries

- Abuse & Burn Injuries
 - Can occur in any age group; children highest incidence
 - Burn injuries accounts for 10% of all child abuse cases
- Suspect Abuse When:
 - Burn distribution inconsistent with reported incident
 - Delay in seeking medical attention
 - History of family instability
 - Inability to cope with stress in time of crisis
- Laws Related to Suspicion of Abuse
 - Must report suspected abuse cases !!



Zones of Burn Injury

- **Zone of Coagulation**
 - Inner Zone
 - Area of cellular death (necrosis)
- **Zone of Stasis**
 - Area surrounding zone of coagulation
 - Cellular injury: decreased blood flow & inflammation
 - Potentially salvable; susceptible to additional injury
- **Zone of Hyperemia**
 - Peripheral area of burn
 - Area of least cellular injury & increased blood flow
 - Complete recovery of this tissue likely.





Causes of Burn Injuries

- Thermal
- Electrical
- Chemical
- Radiation
- Cold Injuries
- Inhalation



Causes of Burn Injuries Cont.,

- Thermal Injuries (most common)
 - Contact
 - Direct contact with hot object (i.e. pan or iron)
 - Anything that sticks to skin (i.e. tar, grease or foods)
 - Scalding
 - Direct contact with hot liquid / vapors (moist heat)
 - i.e. cooking, bathing or car radiator overheating
 - Single most common injury in the pediatric client
 - Flame
 - Direct contact with flame (dry heat)
 - i.e. structural fires / clothing catching on fire



Causes of Burn Injuries Cont.,

- Electrical
 - Contact with an electrical current
 - i.e. open wiring or being struck by lightening
 - Pediatrics: chewing on electrical cord or placing object in outlet
 - Require some different management
- Chemical
 - Strong acids or alkaloids
 - i.e. household cleaning products
 - Management specific to chemical involved



Causes of Burn Injuries Cont.,

- Radiation

- Prolonged exposure to ultraviolet rays of the sun
- Other sources: occupational or medical therapies

- Cold Injuries

- Frostbite

- Don't forget all burns not from heat !!
 - Injury due to freezing & refreezing of intracellular fluid
 - Ice crystals puncture the cells and destroy tissue
 - Can result in amputation



Causes of Burn Injuries Cont.,

- Inhalation Injuries
 - Suspect inhalation injury when:
 - Burn occurred within a closed space
 - Burns to face or neck
 - Singed nasal hair or eyebrows
 - Hoarseness, voice changes, wheezing or stridor
 - Sooty sputum
 - Brassy cough or drooling
 - Labored breathing or tachypnea
 - Erythema and blistering of oral or pharyngeal mucosa
 - Often requires intubation & mechanical ventilation



Causes of Burn Injuries Cont.,

- Inhalation Injuries Cont.,
 - Carbon Monoxide Poisoning**
 - Most common inhalation injury
 - May occur with or without cutaneous burns
 - Hemoglobin's affinity for carbon monoxide is 200x greater than that for oxygen; result = hypoxia
 - Diagnosis:
 - Serum COHb levels & ABG's
 - Pulse Ox: false readings !!
 - Management: 100% O₂
 - Face mask or mechanical ventilation



Classification of Burn Injuries Cont.,

- **Depth of Burn Injury**

- Superficial-Thickness
- Partial Thickness
 - Superficial
 - Deep
- Full Thickness
- Deep-Full Thickness

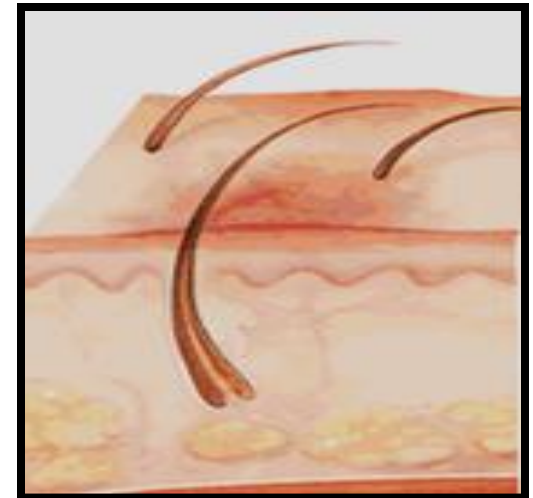
- **Size of Burn Injury**

- Total body surface area (TBSA) burned



Superficial-Thickness Burns

- Involves the epidermis
 - Wound Appearance:
 - Red to pink
 - Mild edema
 - Dry and no blistering
 - Pain / hypersensitivity to touch
 - i.e. Classic sunburn
 - Desquamation (peeling of dead skin) occurs 2-3 days post-burn
 - Wound Healing:
 - In 3 to 5 days (spontaneous)
 - No scarring / other complications





Partial-Thickness Burns

- Two Types
 - Superficial, partial-thickness
 - Deep, partial-thickness



Superficial, Partial-Thickness Burns

- Involves upper 1/3 of dermis
 - Wound Appearance:
 - Red to pink
 - Wet and weeping wounds
 - Thin-walled, fluid-filled blisters
 - Mild to moderate edema
 - Extremely painful
 - Wound Healing:
 - In 2 weeks (spontaneous)
 - Minimal scarring; minor pigment discoloration may occur





Deep, Partial-Thickness Burns

- Involves larger portion of dermis (not complete)
 - Wound Appearance:
 - Mottled: Red, pink, or white area
 - Moist
 - No blisters
 - Moderate edema
 - Painful; usually less severe
 - Wound Healing:
 - May heal spontaneously 2-6 weeks
 - Hypertrophic scarring / formation of contractures
 - Wound Management:
 - Treatment of choice: surgical excision & skin grafting



Full-Thickness Burns

- Involves the entire epidermis and dermis
 - Wound Appearance:
 - Dry, leathery and rigid
 - + Eschar (hard and in-elastic)
 - Red, white, yellow, brown or black
 - Severe edema
 - Painless & insensitive to palpation
 - Wound Healing:
 - No spontaneous healing; weeks to months with graft
 - Wound Management:
 - Surgical excision & skin grafting





Deep, Full-Thickness Burns

- Extends beyond the skin to include muscle, tendons & possibly bone.
 - Wound Appearance:
 - Black (dry, dull and charred)
 - Eschar tissue: hard, in-elastic
 - No edema
 - Painless & insensitive to palpation
 - Wound Healing:
 - No spontaneous healing; weeks to months with graft
 - Wound Management:
 - Surgical excision & skin grafting
 - Frequently requires amputation if extremity involved

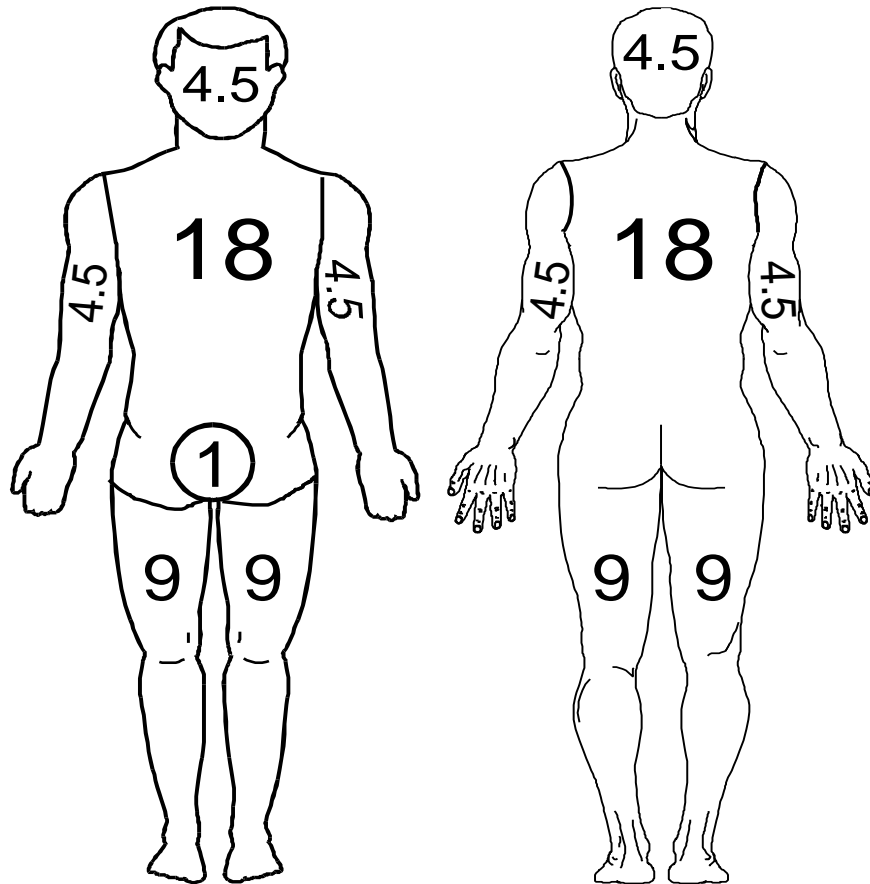


Classification of Burn Injuries Cont.,

- Size of a Burn Injury
 - Total Body Surface Area (TBSA) Burned
 - **Palmar Method**
 - A quick method to evaluate scattered or localized burns
 - Client's palm = 1 % TBSA
 - **Rule of Nines**
 - A quick method to evaluate the extent of burns
 - Major body surface areas divided into multiples of nine
 - Modified version for children and infants
 - **Lund-Browder Method**
 - Most Accurate; based on age (growth)
 - Can be used for the adult, children & infants

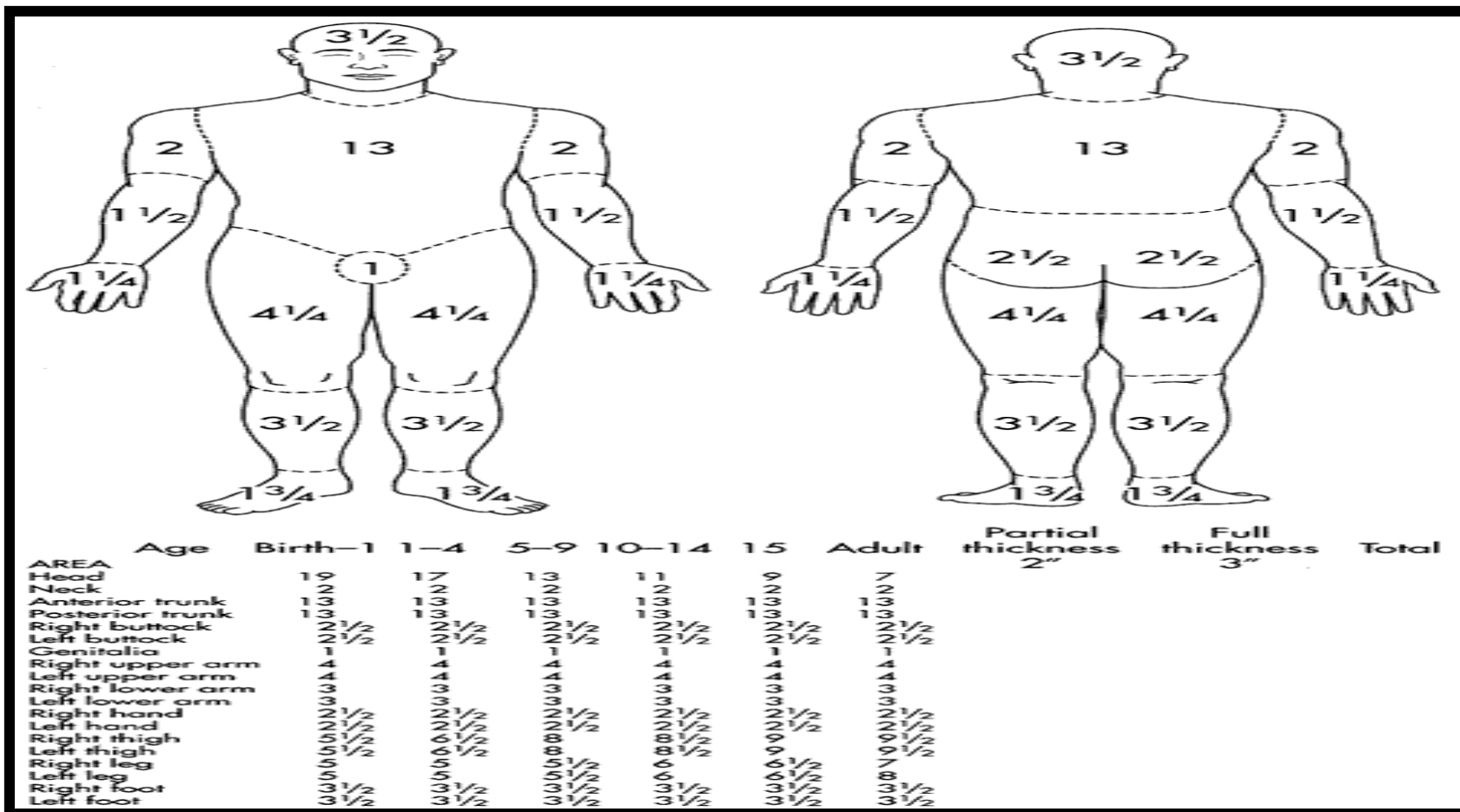


The Rule of Nines





Lund-Browder Method





Severity of Burn Injuries

- Treatment of burns is directly related to the severity of injury!
- Severity is determined by:
 - Depth of burn injury
 - Total body surface (TBSA) burned
 - Location of burn
 - All burns of the face, hands, feet, face or perineum are considered severe !!
 - Client's Age
 - Presences of other preexisting medical conditions or trauma



Management of Burn Injuries

- The most effective treatment of a burn injury is to prevent it from occurring !!
 - Proper education and supervision of children
 - Safety measures for the elderly
 - Working smoke detectors in the home
- Three Phases of Burn Care
 - Resuscitation
 - Acute
 - Rehabilitation

See Smeltzer & Bare pp. 1705; Chart 57-2



Resuscitation Phase

- First 24-48 hours after initial burn injury or until spontaneous diuresis occurs.
- Resuscitation phase characterized by:
 - Life-threatening airway problems
 - Cardiopulmonary Instability
 - Hypovolemia
- Goal:
 - Maintain vital organ function and perfusion



Client Stabilization & History

- **ABC's**
 - Don't forget the basics !!
- **Cool the Burn**
 - Remove clothing, jewelry & diapers in young children
 - Specific burn considerations
- **Client History**
 - Nature of Burn Injury
 - Age
 - Allergies
 - Tetanus Immunization Status
 - Significant Past Medical History



Burn Depth





First Degree Burns

- Epidermis affected only
- Red or pink, dry, painful, blanches to touch
- Epidermis is intact
- Spontaneous healing within 7 days. Outer injured epithelial cells peel
- Seldom clinically significant





Superficial Partial Thickness

- Entire epidermis & portion of dermis (Papillary dermis)
- Homogenous pink
- Painful
- Blisters
- Blanches
- Hair usually intact
- Does not scar, may pigment differently



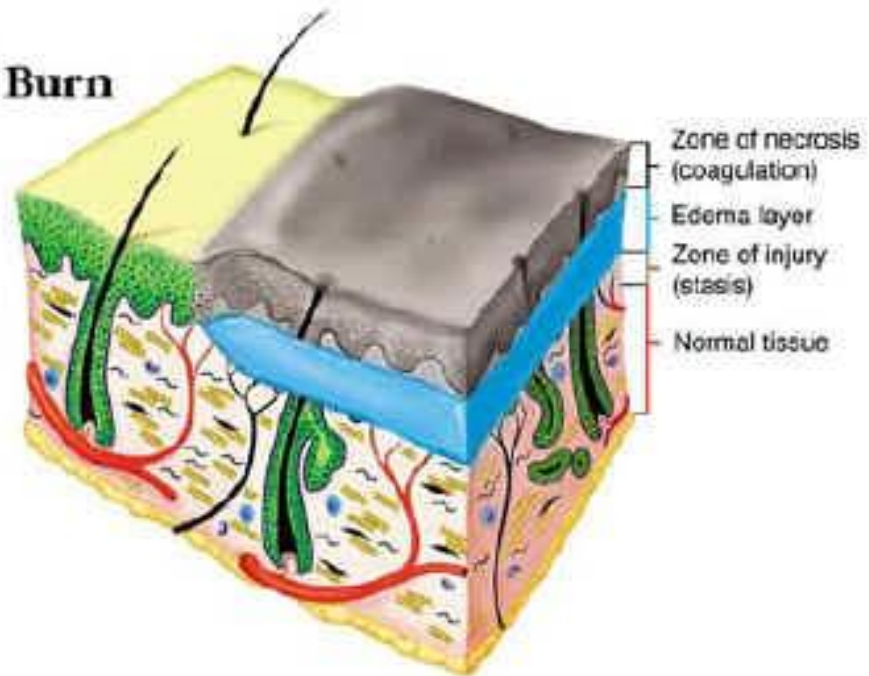


Sup 2nd degree

Superficial Dermal Burn

Characteristics

1. Necrosis confined to upper third of dermis
2. Zone of necrosis lifted off viable wound by edema
3. Small zone of injury





Deep partial thickness

- Reticular dermis
- Mottled red and white
- Not painful to pinprick or pressure
- Does not blanch
- Heals > 3 weeks
- Usually scars
- Need to excise and graft



Deep Partial Thickness



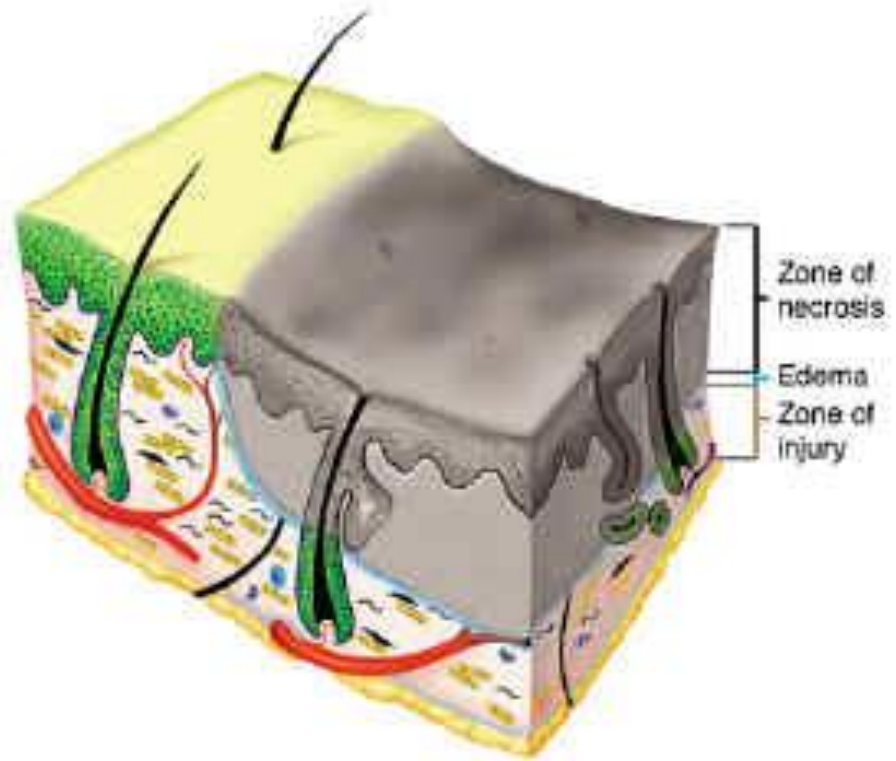


Deep dermal

Deep Dermal Burn

Characteristics

1. Necrosis involving majority of skin layers
2. Zone of necrosis adherent to zone of injury
3. Smaller edema layer





Full Thickness: 3rd degree

- May go into fat or deeper
- Red, white, brown, black
- Inelastic and leathery
- painless or numb
- Heals only from the periphery
- Always excise and graft



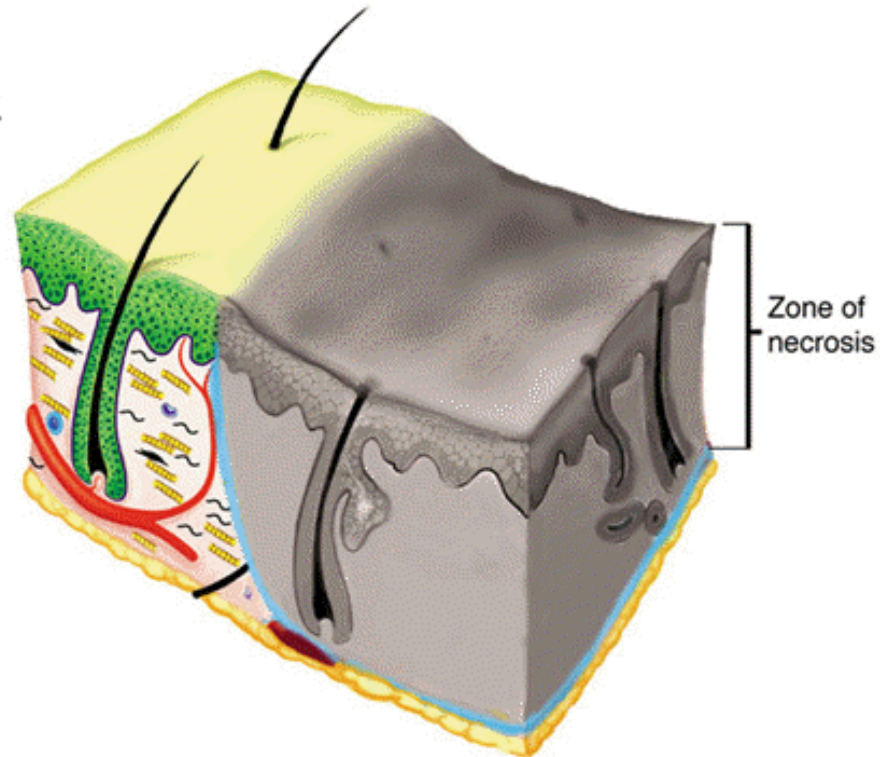


Full-thickness

Full Thickness Burn

Characteristic

No remaining viable dermis

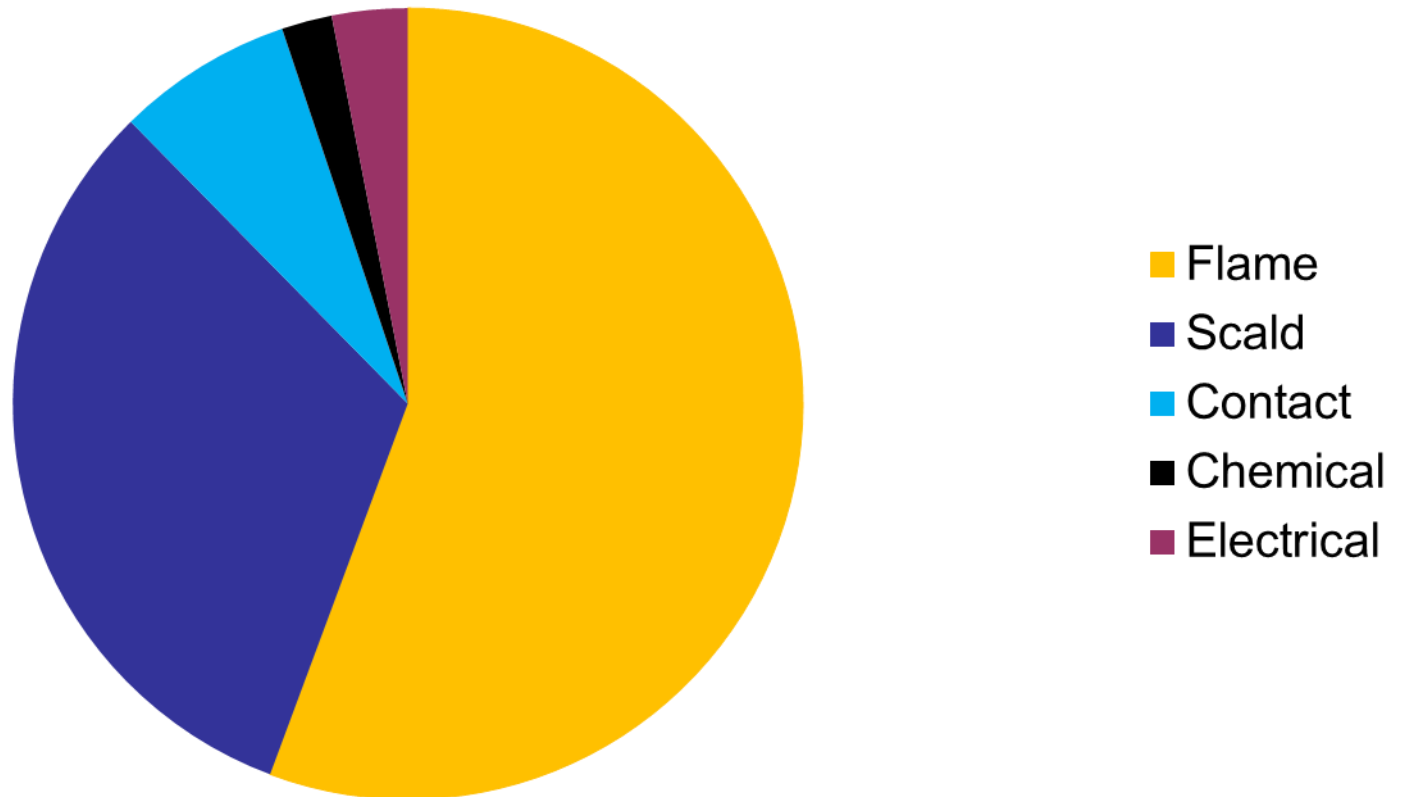




Etiology

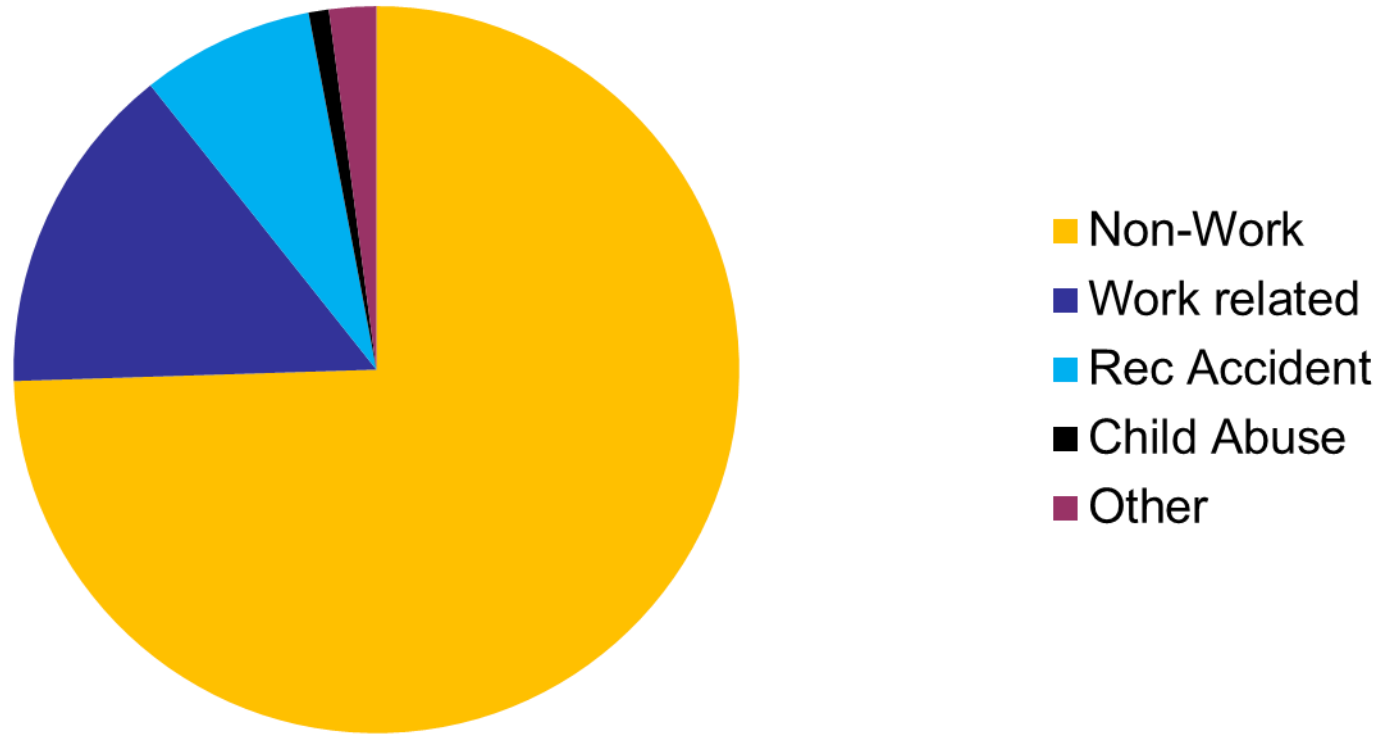


Types of burns



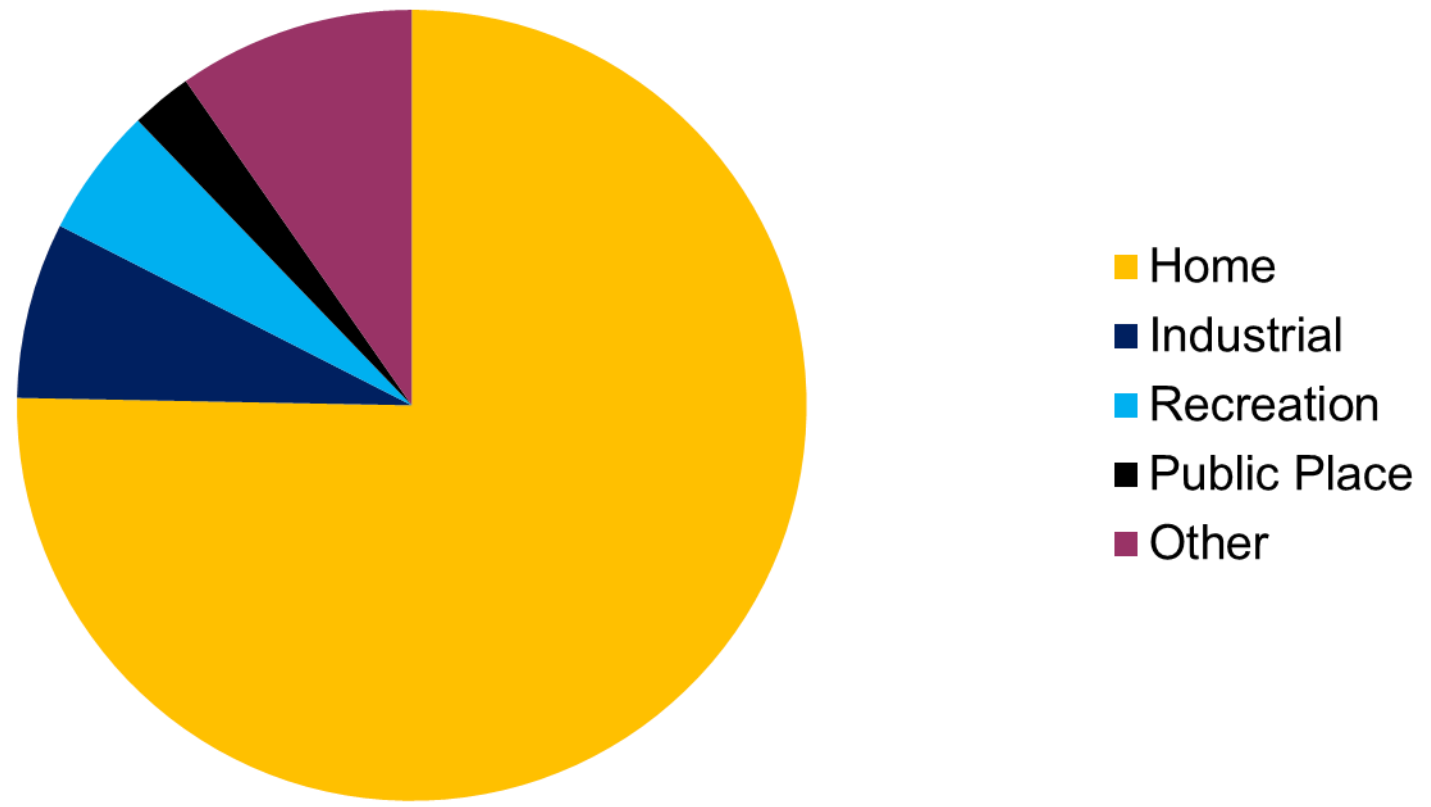


Circumstances of injury





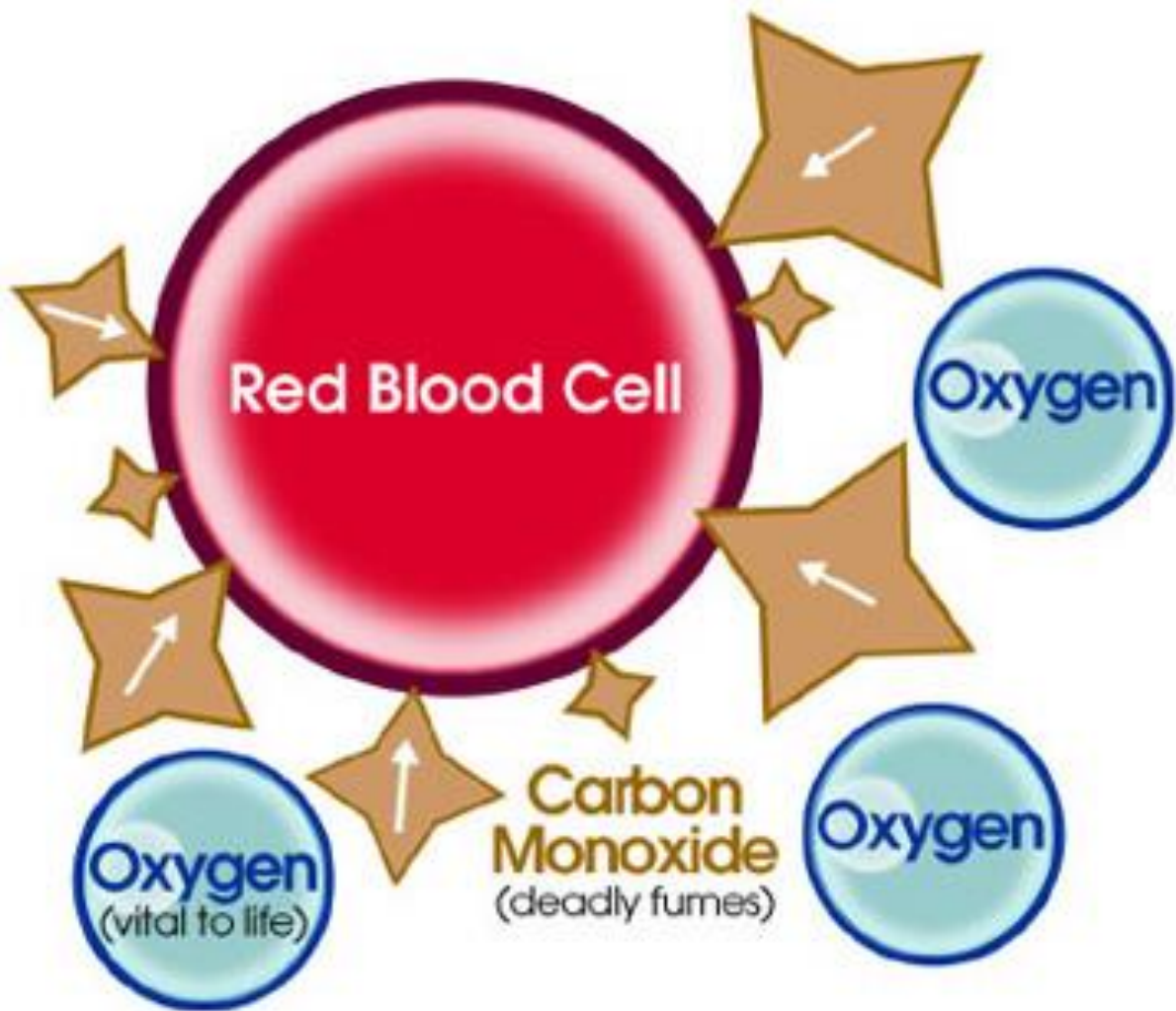
Where do burns occur





Pathophysiology

- *The* main factor responsible for mortality in thermally injured patients
- Carbon monoxide the most common toxin
 - 200 times greater affinity
 - Competitive inhibition with cytochrome P-450





Poison management = CO

- 500 unintentional deaths each year
- Persistent Neurologic Sequelae
 - May improve over time
- Delayed Neurologic Sequelae
 - Relapse later



Carbon Monoxide Poisoning

- 10% COHb – asymptomatic, seen most often in smokers, truck drivers, traffic police
- 20% COHb - headache, nausea, vomiting, loss of dexterity
- 30% COHb - confusion & lethargy, possible ECG changes
- 40-60% COHb - coma
- 60% + - usually fatal

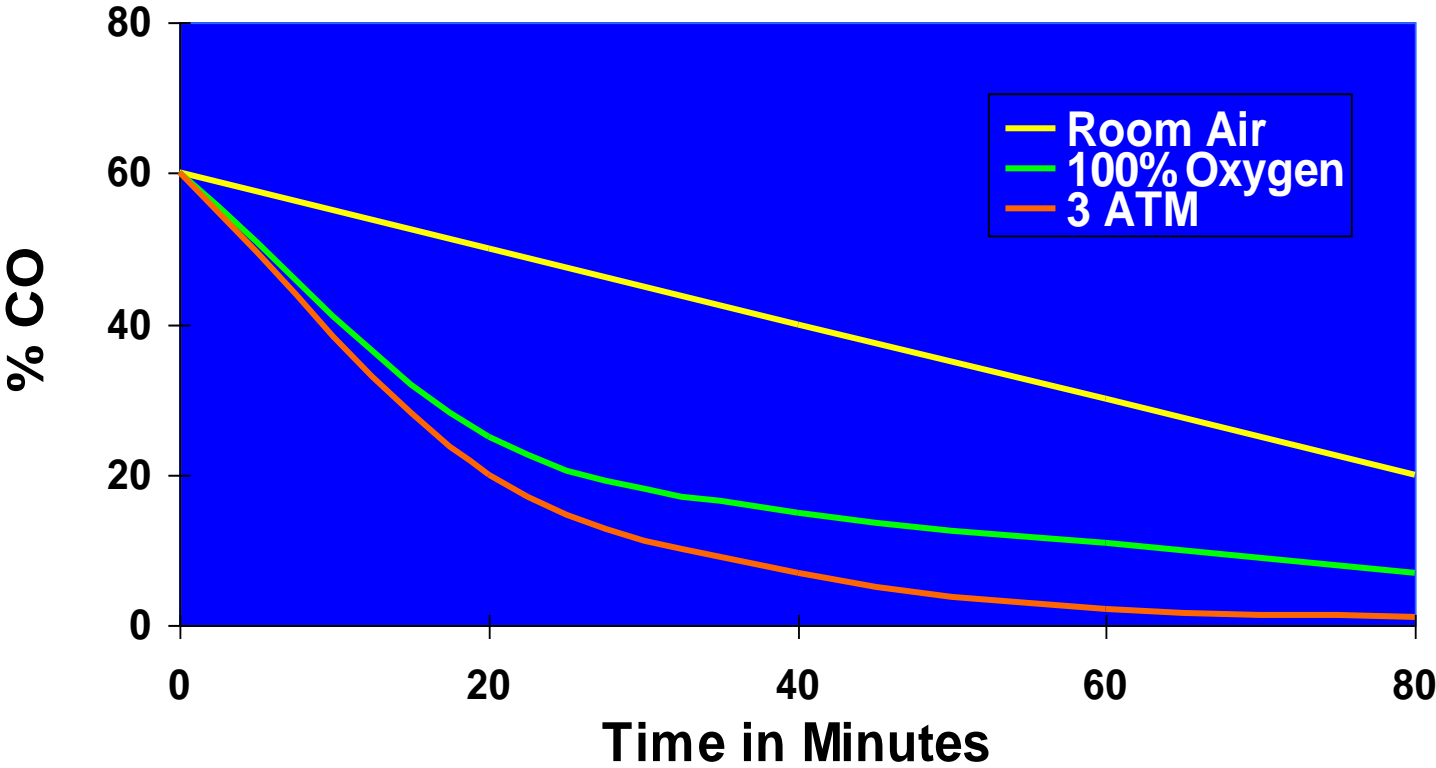


Poison management = CO

- Treatment
 - CO level means nothing to predict outcome
 - Length of hypoxia is the determining factor
 - Oxygen
 - HBO
 - No studies show benefit in treatment



Reduction of CO





Determine Burn Severity

- % BSA involved
- Depth of injury
- Age
- Associated/pre-existing disease or illness
- Burns to face, hands, genitalia





Difficulties with accurate initial assessment of burn size & depth

- Soot, blisters, adherent clothing or debris obscure wound
- Burns are dynamic...Progression is always a risk



Burn Extent

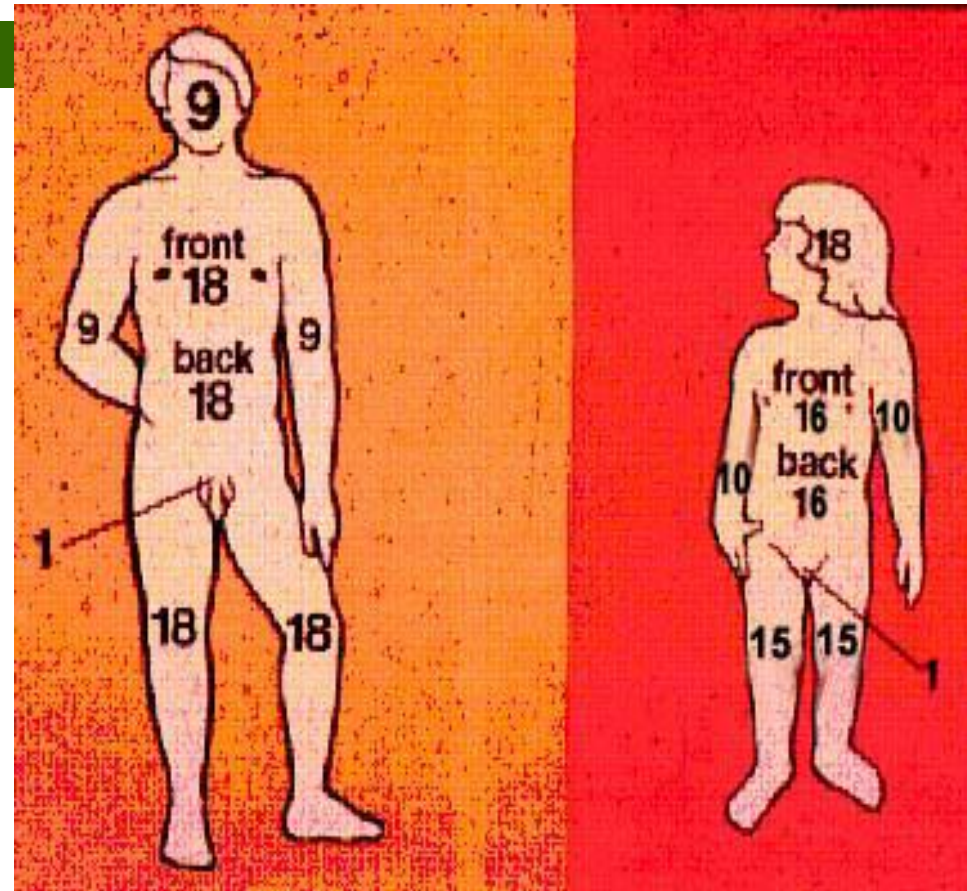
Total Body Surface Area (TBSA)?

- Rule of nines
- Lund and Browder chart
- Patients palm = about 1% TBSA



Extent of Burn : “Rule of Nines”

- Adult anatomical areas = 9% BSA (or multiple)
- Not accurate for infants or children due to larger BSA of head & smaller BSA legs.
- Burn diagrams illustrate adult – child differences





Burn Estimate and Diagram Age vs Area

Burn Diagram

Initial Evaluation

Cause of burn _____

Date of Burn _____

Time of Burn _____

Age _____

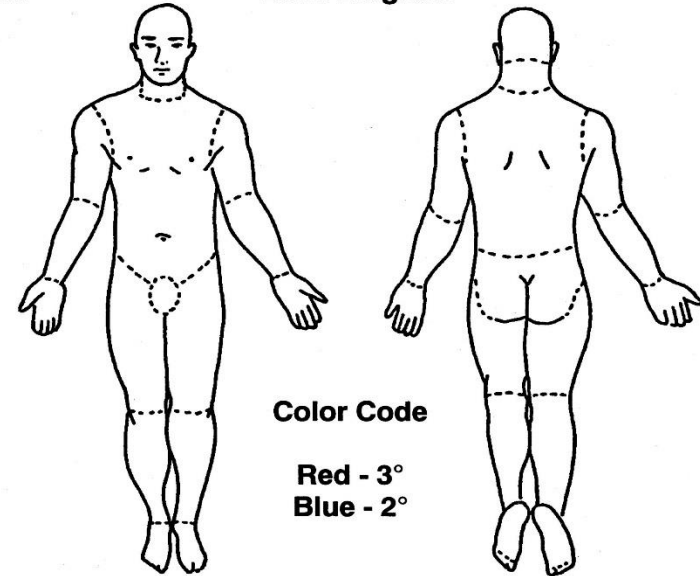
Sex _____

Weight _____

Date of Admission _____

Signature _____

Date _____



Lund & Browder Chart

Area	Birth 1 yr.	1-4 yrs.	5-9 yrs.	10-14 yrs.	15 yrs.	Adult	2°	3°	Total	Donor Areas
Head	19	17	13	11	9	7				
Neck	2	2	2	2	2	2				
Ant. Trunk	13	13	13	13	13	13				
Post. Trunk	13	13	13	13	13	13				
R. Buttock	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2				
L. Buttock	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2				
Genitalia	1	1	1	1	1	1				
R.U. Arm	4	4	4	4	4	4				
L.U. Arm	4	4	4	4	4	4				
R.L. Arm	3	3	3	3	3	3				
L.L. Arm	3	3	3	3	3	3				
R. Hand	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2				
L. Hand	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2				
R. Thigh	5 1/2	6 1/2	8	8 1/2	9	9 1/2				
L. Thigh	5 1/2	6 1/2	8	8 1/2	9	9 1/2				
R. Leg	5	5	5 1/2	6	6 1/2	7				
L. Leg	5	5	5 1/2	6	6 1/2	7				
R. Foot	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2				
L. Foot	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2				
Total										



Extent of Burns

Patient's palmar surface (hand + fingers) = 1% TBSA

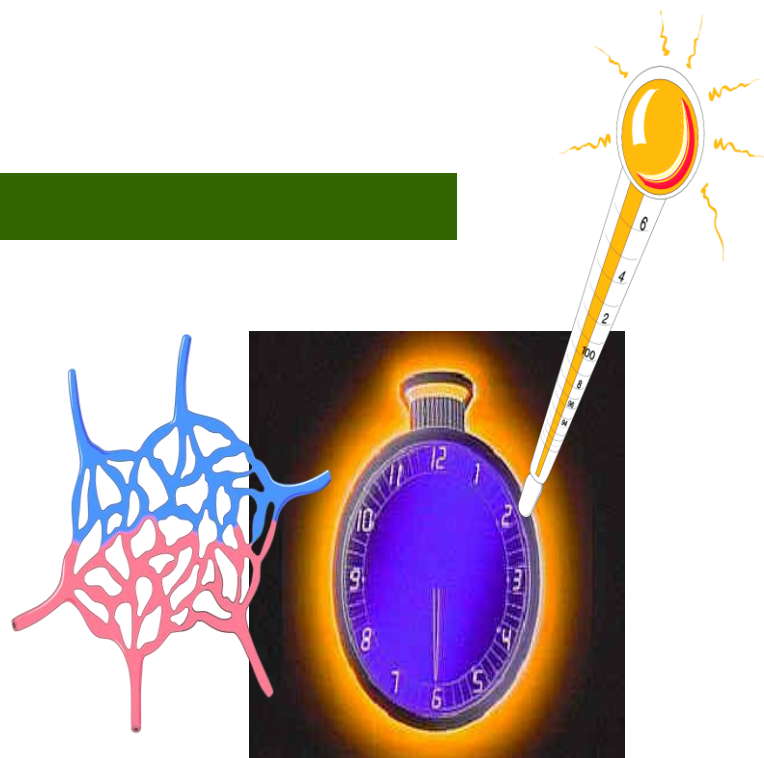




Burn Depth

Factors

- Temperature
- Duration of contact
- Dermal thickness
- Blood supply
- **Special Consideration: Very young and very old have thinner skin**





Burns begin at 44 degrees C

- **6 hours for burns to occur at 111 degrees F (44 C)**
- **1 second of burns to occur at 140 degrees F (60 C)**



Time For Full Thickness Burns To Occur In Scalds

- 5 seconds in water @ 140 F (60 C)
- 30 seconds in water @ 130 F (55 C)
- **5 minutes in water @ 120 F (49 C)**



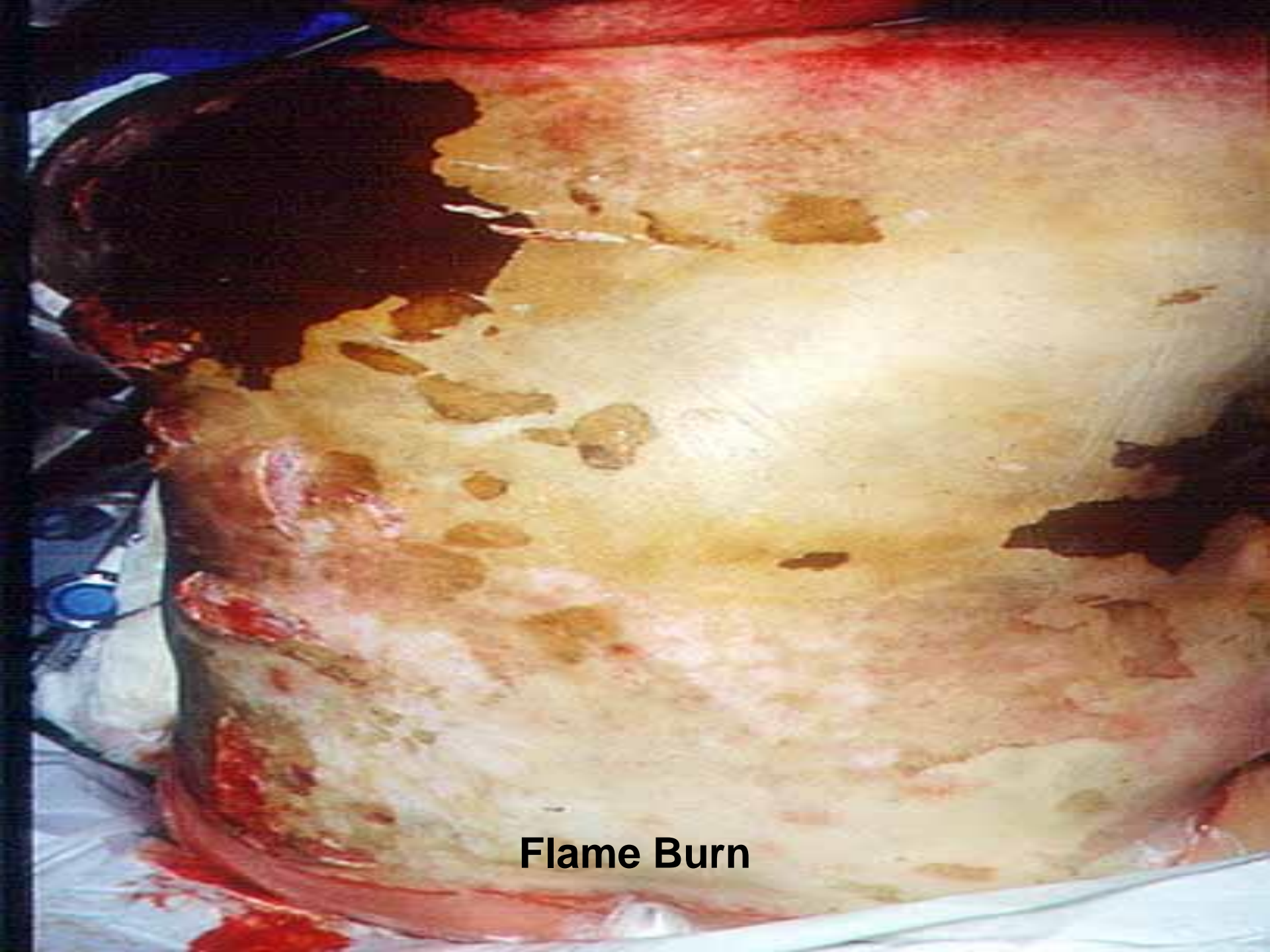
Contact



Contact Burn



Scald Burn



Flame Burn



Grease Burn





Burn Center Referrals

- Partial thickness burns > 10% TBSA
- All full-thickness burns
- All burns of the face, hands, feet, face or perineum
- All electrical, inhalation & chemical burn injuries
- All burn injuries in poor-risk client or with concurrent trauma



Respiratory

- Secure and protect the client's airway
 - Cervical spine immobilization; if necessary
- Assess for inhalation injury:
 - If an inhalation injury is suspected:
 - Administer oxygen as prescribed: 100 % O₂
 - Obtain & Monitor: HbCO levels & ABG's
 - Monitor for hypoxia &/or airway obstruction
 - Anticipate nasotracheal or endotracheal intubation
 - Circumferential chest burns can impair ventilation
 - Escharotomy (eschar incision) maybe required



Respiratory Cont.,

- Nursing Management
 - Respiratory Care:
 - Assess often: airway, respirations & breath sounds
 - High-Fowler's position
 - Assist with the removal of pulmonary secretions
 - Added humidity to supplemental oxygen
 - Chest PT, deep breathing & coughing, frequent position changes and suctioning as needed.
 - Pharmacologic Considerations:
 - Bronchodilators and mucolytics agents



Cardiovascular

- Burn Injuries:
 - Increase capillary permeability
 - AKA “Capillary Leakage Syndrome”
 - Fluid shifts from intravascular to interstitial space = blistering and massive edema.
 - Excessive insensible losses via burn wound
 - May reach 3-5 liters a day!!
- = Net result is hypovolemia**
- Labs: ↑ Hgb & Hct levels
 - If untreated; may lead to burn shock



Burn Shock

- Shock is a state of inadequate cellular perfusion
- Burn Injuries involving > 35 % TBSA
- Clinical manifestations:
 - Hypotension & tachycardia
 - Decreased Cardiac Output:
 - Decreased preload, stroke volume & contractility
 - Increased afterload
 - Monitoring: PAOP & CVP values decreased
 - Prevention: Early & full fluid resuscitation !!



Fluid-Balance Considerations

- Assessment of depth and extent of burn injury.
 - Care to keep client warm during assessment
 - Clean technique
- Cleanse the wound and cover quickly
- Nursing Role:
 - Large gauge I.V. catheter (if not already in place)
 - Considerations: Central Line Insertion
 - Foley catheter & NG tube placement
 - Diagnostics
 - Baseline: height, weight, labs & CXR
 - Administer: tetanus prophylaxis; if needed
 - Only medication given IM !!



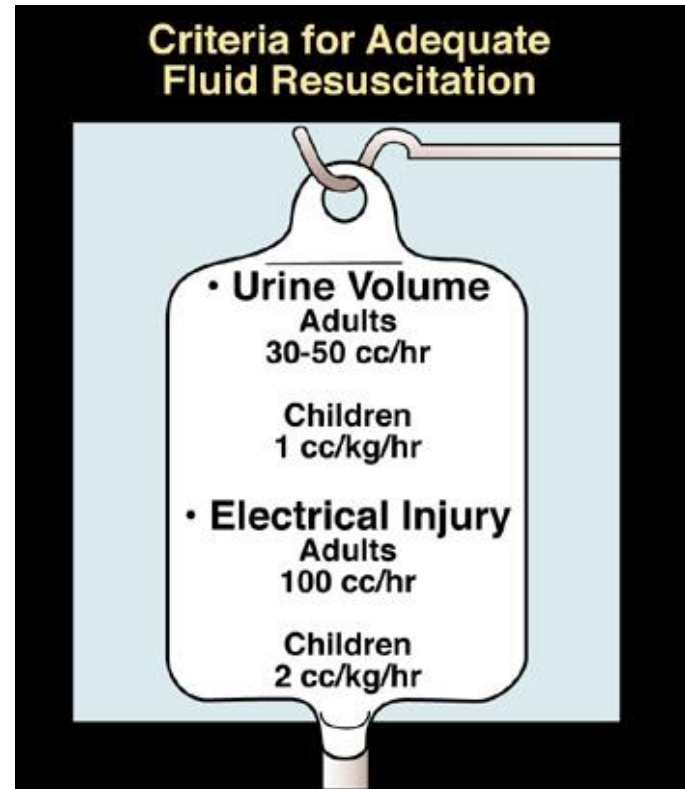
Adult Fluid Resuscitation

- Fluid of Choice
 - Lactated Ringer's (LR)
- Parkland Formula:
 - Guideline for 24 hour initial fluid resuscitation
 - 4 ml (LR) **x** % of burn **x** weight (Kg)
 - First ½ of total volume given in the first 8 hours
 - Remaining ½ of total volume given over following 16 hours



Special Considerations: Fluid Resuscitation

- Pediatric Considerations:
 - D5LR
- Electrical Injuries:
 - Can cause muscle destruction, resulting in myoglobin in urine.
 - Urine output needs to be maintained at 100 ml/hr (adult) to prevent acute renal failure.





Assessment of Adequacy of Fluid Resuscitation

- Monitor
 - Urinary Output
 - Adult: ≥ 30 ml / hr
 - Daily Weights
 - Vital Signs
 - Heart rate and blood pressure
 - CVP and PAOP values
 - Level of Consciousness
 - Laboratory values



Resuscitation Phase Cont.,

- Additional Nursing Considerations:
 - Cardiac Monitoring
 - Pre-existing cardiac conditions
 - All electrical burn injuries
 - Pain Management
 - Must be addressed early and often !!
 - I.V. Route Only
 - **No IM or SQ injections**
 - Capillary leakage results in unpredictable absorption !!



Monitor for Complications

- Burn Wounds
 - Risk For Infection
 - Wound itself most common source
 - Infection remains a threat until burns have healed or have been closed by grafting.
 - Monitor closely for sign/symptoms of infection
 - Alterations in thermoregulation
 - Fluid and heat losses from burn wound
 - Maintain body temperature (97° – 101° F)
 - Minimize heat losses from wound = cover



Complications Cont.,

- **Electrolytes Imbalances**
 - Hyperkalemia
 - A result of cellular destruction
 - Hyponatremia
 - A result of fluid shifts into interstitial space
- **Acid-Base Imbalances**
 - Metabolic Acidosis
 - Failure to conserve bicarbonate
 - Also, a result of fluid shifts into interstitial space



Complications Cont.,

- Renal
 - Decreased renal blood flow which leads to ↓ GFR
 - Muscle damage & RBC destruction
 - Myoglobin and hemoglobin in urine
 - = Both may lead to acute renal failure (ARF)**
- Gastrointestinal
 - Paralytic ileus
 - NG tube
 - Curling's Ulcer
 - H2 blockers or proton-pump inhibitors



Complications Cont.,

- Impaired Peripheral Circulation
 - Three Main Factors:
 - Eschar, Burn Edema & Circumferential Burns
 - = The net results is restricted blood flow to the distal extremity, which can result in tissue ischemia and necrosis.
 - Nursing Assessment Considerations:
 - Complete Neurovascular Checks Frequently !!
 - Pulses, skin color, capillary refill, motor & sensation
 - Doppler pulse assessments
 - Management
 - Escharotomies: incisions through the eschar tissue to restore circulation to compromised extremities.



Complications Cont.,

- Impaired Peripheral Circulation Cont.,
 - Compartment Syndrome:
 - In extremities; muscle groups surrounded by fascia. Inability of this fibrous tissue to expand related to edema results in:
 - Increased compartmental pressure
 - Decreased circulation
 - Nerve entrapment
 - Often a result of deep, full-thickness burns
 - Surgical Management:
 - Fasciotomy incisions through the eschar tissue & fascia to restore circulation to compromised extremities



Acute Phase

- Begins diuresis and ends when the burned area is completely covered or when wounds are healed.
 - Top priority in the acute phase is burn wound management.
 - Aseptic technique is critical to prevent infection and promote healing.



Fluid-Balance Considerations

- Capillaries Regain Integrity
 - Fluid shifts: interstitial → intravascular
 - “Mobilization” of fluid = Decreasing Edema
 - i.e. Decreasing Hgb & Hct
 - Monitor for Electrolyte Imbalances
 - i.e. hypokalemia and hyponatremia
 - Monitor for Fluid Overload
 - Especially the client with ↓ cardiac or renal function.
 - Complications: Heart failure and pulmonary edema



Burn Wounds

- Risk for Infection
 - Skin is your first of line of defense against infection
 - Necrotic tissue is a excellent medium for bacterial growth
 - Management
 - Burn wounds are frequently monitored for bacteria colonization:
 - Wound swab cultures and invasive biopsies



Burn Wound Care





Burn Wound Care

- Cleanse the wound
 - Pain medications as needed; 20-30 minutes prior to all wound care procedures !!
 - Hydrotherapy
 - Shower, shower carts, bed baths or clear water spray
 - Maintain proper water and room temperature
 - Limit duration to 20-30 minutes
 - Don't break blister (require needle aspiration)
 - Trim hair around wound; expect eyebrows
 - Dry with towel; pat dry don't rub
 - Don't forget about cleansing unburned skin and hair



Burn Wound Care Cont.,

- Apply an Antimicrobial Agent
 - Silver dressing
 - Broad spectrum; the most common agent used
 - Famactive alginate AG, Suprasorb A+AG
 - Sulfamylon
 - Penetrates eschar for invasive wound infections
 - Painful burns for approximately 20 minutes after applied
 - Betadine
 - Drying effect makes debridement of the eschar easier
 - **Vliwaktiv® Charcoal Dressing** (antimicrobial occlusive dressing)
 - A silver impregnated gauze that can be left in place for 5 days



Burn Wound Care Cont.,

- Cover with a Sterile Dressing
 - Most wounds covered with several layers of sterile gauze dressings.
 - Special Considerations:
 - Joint area lightly wrapped to allow mobility
 - Facial wounds maybe left open to air
 - Must be kept moist; prevent conversion to deep wound
 - Circumferential burns: wrap distal to proximal
 - All fingers and toes should be wrapped separately
 - Splints always applied over dressings
 - Functional positions maintained; not always comfortable



Burn Wound Care Cont.,

- Debridement of the wound

- May become completed at the bedside with wound care or as a surgical procedure.
- Types of Debridement:

- **Natural**

- Body & bacterial enzymes dissolve eschar; takes a longtime

- **Mechanical**

- Sharp (scissors), Wet-to-Dry Dressings or Enzymatic Agents

- **Surgical**

- Operating room / general anesthesia



Surgical Management

- Skin Grafting
 - Closure of burn wound
 - Spontaneous wound healing would take months for even a small full-thickness burn
 - Eschar is a bacteria playground and needs to be removed as soon as possible to prevent infection
 - Wound needs to be covered to prevent infection, the loss of heat, fluid and electrolytes
 - Therefore, skin grafting is done for most full-thickness burns.
 - Can be permanent or temporary



Burn Wound Closure

- Permanent Skin Grafts
 - Two types:
 - Autografts and Cultured Epithelial Autografts (CEA)
 - Autograft
 - Harvested from client
 - Non-antigenic
 - Less expensive
 - Decreased risk of infection
 - Can utilize meshing to cover large area
 - Negatives: lack of sites and painful



Permanent Burn Wound Closure Cont.,

- Permanent Skin Grafts Cont.,
 - Cultured Epithelial Autografts (CEA)
 - A small piece of client's skin is harvested and grown in a culture medium
 - Takes 3 weeks to grow enough for the first graft
 - Very fragile; immobile for 10 days post grafting
 - Great for limited donor sites
 - Negatives: very expensive; poor long term cosmetic results and skin remains fragile for years



Temporary Burn Wound Closure Cont.,

- Temporary Skin Grafts
 - Why temporary ??
 - Clients with large amounts of TBSA burned do not have enough donor sites.
 - Available donor sites are used first, but in large burns not enough to cover all burn wounds.
 - While waiting for donor site to heal so it can be reused a temporary covering is needed.
 - Types of temporary Skin Grafts
 - Biosynthetic
 - Artificial Skins
 - Synthetic



Temporary Burn Wound Closure Cont.,

- **Biosynthetic Temporary Skin Grafts**
 - Homograft
 - AKA Allograft
 - Live or cadaver human donors
 - Fairly expensive
 - Best infection control of all biologic coverings
 - Negatives:
 - Risk of disease transmission (i.e. HBV & HIV)
 - Antigenic: body rejects in 2 weeks
 - Not always available
 - Storage problems



Temporary Burn Wound Closure Cont.,

- **Biosynthetic Temporary Skin Grafts Cont.,**
 - Heterograft
 - AKA Xenograft
 - Graft between 2 different species
 - i.e. Porcine (pig) most common
 - Fresh, frozen or freeze-dried (longer shelf life)
 - Amendable to meshing & antimicrobial impregnation
 - Antigenic: body rejects 3-4 days
 - Fairly inexpensive
 - Negatives: Higher risk of infection



Temporary Burn Wound Closure Cont.,

- Temporary Skin Grafting Cont.,
 - **Artificial Skins**
 - Transcyte:
 - A collagen based dressing impregnated with newborn fibroblasts.
 - Integra:
 - A collagen based product that helps form a “neodermis” on which to skin graft.
 - **Synthetic**
 - Any non-biologic dressing that will help prevent fluid & heat loss
 - Biobrane, Xeroform or Beta Glucan collagen matrix



Donor Site: Wound Considerations

- The donor site is often the most painful aspect for the post-operative client.
 - We have created a brand new wound !!
 - Variety of products are used for donor sites.
 - Most are left place for 24 hours and then left open to air.
 - Donor sites usually heal in 7-10 days



Nutritional Support

- Burn wounds consume large amounts of energy:
 - Requires massive amounts of nutrition & calories to decrease catabolism & promote wound healing.
 - Nutrition Consults Helpful !!
- Monitoring Nutritional Status
 - Weekly pre-albumin levels
 - Daily weights



Nutritional Support Cont.,

- Routes of Nutritional Support
 - High-protein & high-calorie diet
 - Often requiring various supplements
 - Routes:
 - Oral
 - Enteral
 - Gut is the preferred alternative route; started ASAP
 - i.e. G-tube or J-tube
 - Parenteral
 - i.e. TPN and PPN
 - Associated with an increased risk of infection



Rehabilitation Phase

- Begins day one and may last several years
 - Nursing, OT and PT are major providers
 - Meticulous asepsis continues to be important
- Major areas of focus:
 - Support of adequate wound healing
 - Prevention of hypertrophic scarring & contractures
 - Psychosocial Support
 - Client and family
 - Promotion of maximal functional independence



Hypertrophic Scar Formation

- Excessive scar formation, which rises above the level of the skin
- Management: Pressure Garments
 - Elasticized garments that are custom fitted
 - Maintains constant pressure on the wound
 - Result: smoother skin & minimized scar appearance
 - Client Considerations:
 - Must be worn 23 hours a day
 - Need to be worn for up to 1-2 years
 - Are very hot and tight !!



Contracture Formation

- Shrinkage and shortening of burned tissue
- Results in disfigurement
 - Especially if burn injury involves joints
- **Management is opposing force:**
 - Splints, proper positioning and ROM
 - Must begin at day one !!
 - Multidisciplinary approach is essential !!



Psychosocial Considerations

- Alterations in Body Image
 - Loss of Self-Esteem
 - Returning to community, work or school
 - Sexuality
 - Supports Services
 - Psychologist, social work & vocational counselors
 - Local or national burn injury support organizations
 - Nursing Considerations
 - Encourage client & family to express feelings
 - Assist in developing positive coping strategies



Psychosocial Considerations Cont.,

- Nursing Considerations Cont.,
 - LISTEN AND PROVIDE REALISTIC SUPPORT !!
 - Be honest about possible scarring
 - Remember people come to terms with the change in their appearance at their own pace.
 - Provide reassurance that skin grafts always look worse before they look better.
 - Remember how a client looks at discharge is not how they will look in 2 years.



BURNS !!

B Breathing & **B**ody Image

U Urinary output

R Rule of Nines & **R**esuscitation with fluid

N Nutrition

S Shock & **S**ilvadene



Burn Injury: Support Resources

- American Burn Association
<http://www.ameriburn.org/>
1-800-548-2876
- The Phoenix Society of Burn Survivors
<http://www.phoenix-society.org/>
1-800-888-BURN



THANK YOU