

Why do people die from burns?

Shock, dehydration, sepsis

If pt survives first 72 hours → **infection**

Universal Trauma Model

American Burn Association (ABA)

- Develops strategies, prevention, research

PRIMARY GOAL IS **PREVENTION!**

Burn: alteration in skin integrity resulting in tissue loss/damage

4 Major Types/Causes of Burns

Thermal	Chemical
Electrical	Radiation

Thermal Burns

MOST COMMON

Due to exposure to dry heat (flames) or moist heat (steam, hot liquids)

Direct exposure to heat = cell destruction

Includes inhalation injuries r/t gases (CO) & particles

Chemical Burns

Direct skin contact w/ acidic or basic agents

- Treating acidic easier than basic (caustic)

May cause local tissue damage, system tox.

Damage can continue until traces disappear

Includes powders & gases

Treat quick to flush pH & lessen damage

Electrical Burns

Higher mortality than thermal burns

- Can generate a lot of damage, subdermal - high resistance off of tissues

Destructive process of electrical burns persists for weeks beyond the insult

Has an "exit wound"

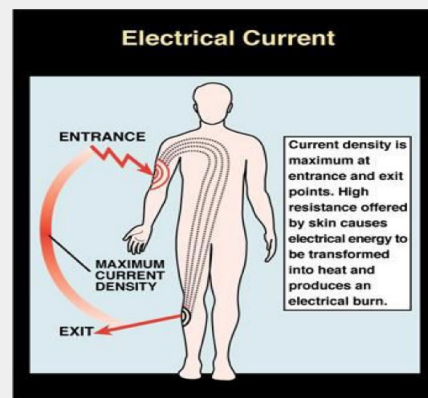
Affects...

- Muscles & bones

- Heart (dysrhythmias)

- Rhabdo → AKI, acute tubular necrosis

Electrical Burns - Electrical Current



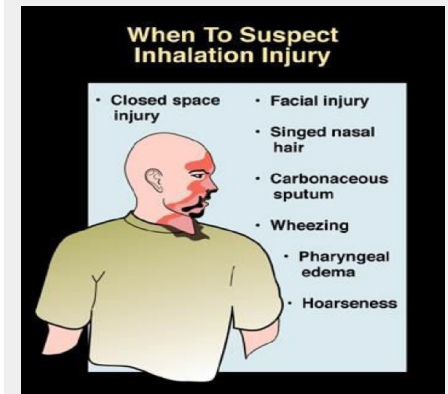
Radiation Burns

Caused by solar or radioactive agents

- UV burns, thermal radiation, ionizing radiation (x-rays)

Also may include friction burns r/t trauma

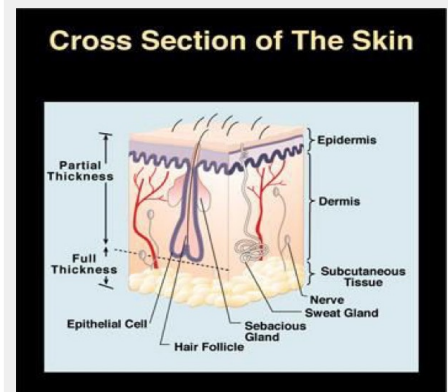
Inhalation Injuries



Result of resp. tract exposure to direct heat, chemicals, or carbon monoxide poisoning

CO poisoning: CO takes over RBC's → AMS, HA, dizzy → 100% NRB

Cross Section of the Skin



C

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Published 10th December, 2018.

Last updated 10th December, 2018.

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Burn Severity Affected By...

Length of exposure Mechanism of injury

Depth of burn Location on body

TBSA % Age - children, older

PMH - DM, CHF

Entire leg → risk of compartment syndrome

Perineum → risk of infection

Functions of the Skin

Protective barrier

Assists w/ fluid & elect. balance

Thermoregulation

Excretion

Sensory organ

Epidermis: basic protection

Dermis: blood vessels, nerves, sweat glands

SQ: fatty tissue; can have veins, arteries, & nerves

Burn Injuries

1st degree (Superficial wounds)

2nd degree (Partial thickness)

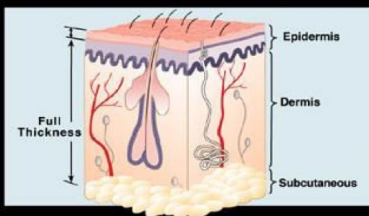
3rd degree (Full thickness)

4th degree? (Bone?)

First Degree Burn

First Degree Burn

- Sunburn
- Involves epidermis only
- Local pain and erythema
- No blisters
- Heals spontaneously without scarring
- Systemic response is minimal



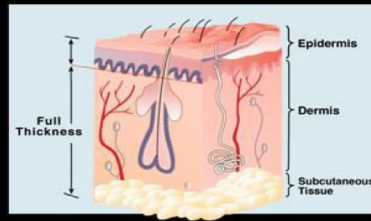
Painful r/t damaged nerves

Warm, blanching effect

Superficial Partial Thickness Burn (Second Degree)

Superficial Partial Thickness Burn

- Involves epidermis and dermis
- Moist appearance
- Blister formation
- Tactile and Pain sensors intact



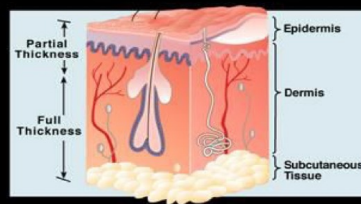
May be shiny, pink, red - blanching?

Scar formation

Deep Partial Thickness Burn (Second Degree)

Deep Partial Thickness Burn

- Involves epidermis and dermis
- Moist appearance
- Blister formation
- Tactile and Pain sensors intact

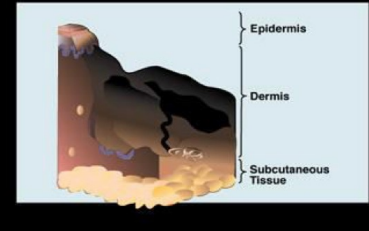


MORE SEVERE, skin grafts may be necessary

Third Degree Burn

Third Degree Burn

- Involves all layers of skin
- Variable color - white, waxy, red, brown
- Destroys elasticity, dry
- Painless
- Does not heal



May be black, some redness, yellow

Skin grafts (doesn't heal on own)

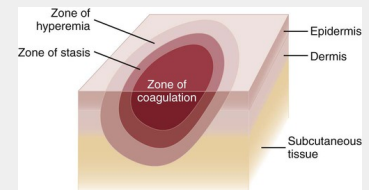
Eschar needs to be removed

Breathing issues if front &/or back of chest

Cartilaginous areas may not heal as well (r/t dec. blood supply)

May have some disability

3 Zones of Injury

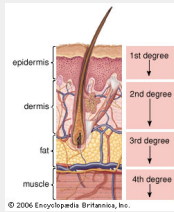


Zone of coag.: injury site, tissue necrosis

Zone of stasis: inflammatory response = vasoconstriction = tissue may be salvaged

Zone of hyperemia: inc. inflammation = vasodilation = inc. blood flow

Degrees of Burns



Systemic Response to Burns

All systems are affected

Extent of dysfunction depends on the TBSA involved

Early: **hypofunction** → **hyperfunction**

- Occurs rapidly
- *Inc. permeability* → *plasma leaks to interstitial spaces* → *dec. CO r/t dec. fluid volume (dec. BP)* → *hyperfunction (compensatory mechanisms)*

Maximal edema occurs in 8-48 hours

Major Burn Event

R/t systemic inflammation

Concerns:

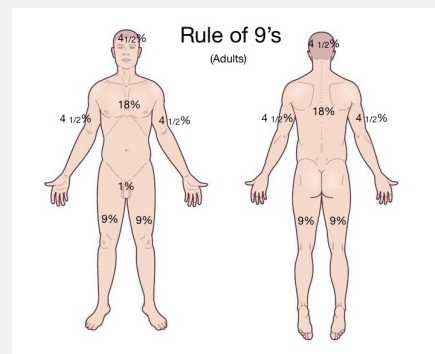
Shock:

- Fluid & electrolyte imbalance
- Temp. regulation
- Pain control (IV)

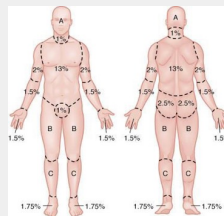
Infection:

- Reverse isolation (*no plants, fresh fruits/veggies, current immunizations*)
- Temp. regulation (room ~80°F)

Rule of 9's

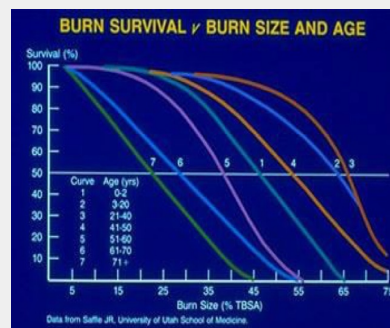


Lund & Browder Classification



* More accurate than the Rule of 9's

Burn Survival & Burn Size



Survival rate decreases = TBSA increases

Burn Shock

Leading cause of mortality

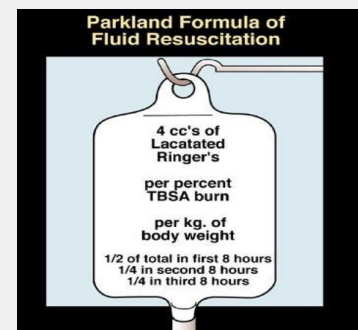
Leads to...

- **Hypotension**
- **Tissue hypoxia**
- **Acute renal failure**

It's critical to accurately estimate fluid losses in order to determine replacement!

- Replace using Parkland Formula

Parkland Formula of Fluid Resuscitation



Lactated Ringer's - corrects Na deficits

Should be started ASAP!

- 2 PIV's if no central line
- Give albumin for edema
- Monitor urine output

Priorities w/ Burn Patients

1. **Stop the burning process**
2. **Airway** - ensure patent
3. **C-spine stabilization**
4. **Breathing** - give 100% O₂ or ventilate
5. **Circulation** - assess pulses or CPR

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Stages of Burn Assessment/Care

1. Emergent/Resuscitative Phase
2. Acute Phase
3. Rehabilitative Phase

1. Emergent/Resuscitative Phase

24-48 hours

Point of injury

Fluid resuscitation

Big risk of...

- **Hypovolemic shock**
- Resp. problems
- Compartment syndrome

Acute Phase

48-72 hours/wound starts to heal

Starts w/ diuresis - Ends w/ closure of burn wound

Interventions:

- Reassess ABC's
- Fluid resuscitation
- Urine output (myoglobinuria)
- Circulation (escharotomy)
- Pain control
- Nutritional support
- Focus on wound care
- Prevent infection

Assessment (Immediate Resuscitative Phase)

- A** Airway → intubated prophylactically
- B** Breathing & ventilation
- C** Circulation
- D** Deficits (neuro)
 - Deformities
 - Disability
- E** Exposure

Rehabilitative Phase

May be years

Begins w/ wound closure - Ends w/ pt at highest level of functioning

Finger injury may not heal correctly → webbing
 Psychosocial → therapy
 Multidisciplinary care - respiratory therapy, PT/OT, speech therapy, plastic surgery

Wound Care

Debridement

- Surgical, enzymatic
- May be painful → ALWAYS pre-medicate
- Prepare for graft

Dressings

- ~~Gauze~~
- Biologic (*skin, membrane*)
- Synthetic
- Biosynthetic

Skin grafts

- Skin won't heal on its own (full thickness)
- Concerns: circulation, mobilization/ROM, pressure on injury

Pressure garments

Hydrotherapy (cleaning)

Homo-/allografts = humans
Hetero-/xenografts = animals

Protective Barriers

Minor	Solosite (<i>gel</i>) Opsite (<i>clear Tegaderm</i>)
Superficial	Allevyn Acticoat (<i>antimicrobial</i>) Mepillex Silvadene/Bacitracin (<i>part/full thickness</i>)
Mid to Deep	Acticoat
Scar Management	Cica Care (<i>silicone gel sheeting</i>) Jobskin

Jobskin: worn to prevent contractures, hypotrophic scar formation
 - Worn 23 hours/day
 - Inhibits pooling, venous stasis

Nursing Diagnoses

Risk for infection

Fluid volume deficit

Alteration in...

- Skin integrity
- Tissue perfusion
- Resp. status

Imbalanced nutrition (*weight loss r/t inc. metabolic rate*)

Impaired mobility

Decreased self-esteem

