



MANAGE BURN CASUALTIES





OVERVIEW



- Anatomy
- Types of Burns
- Degrees of Burns
- Burn Size Estimation
- Treatment for Burns



LEARNING OBJECTIVES

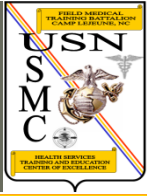


Please Read Your

Terminal Learning Objectives

And

Enabling Learning Objectives





ANATOMY OF THE SKIN



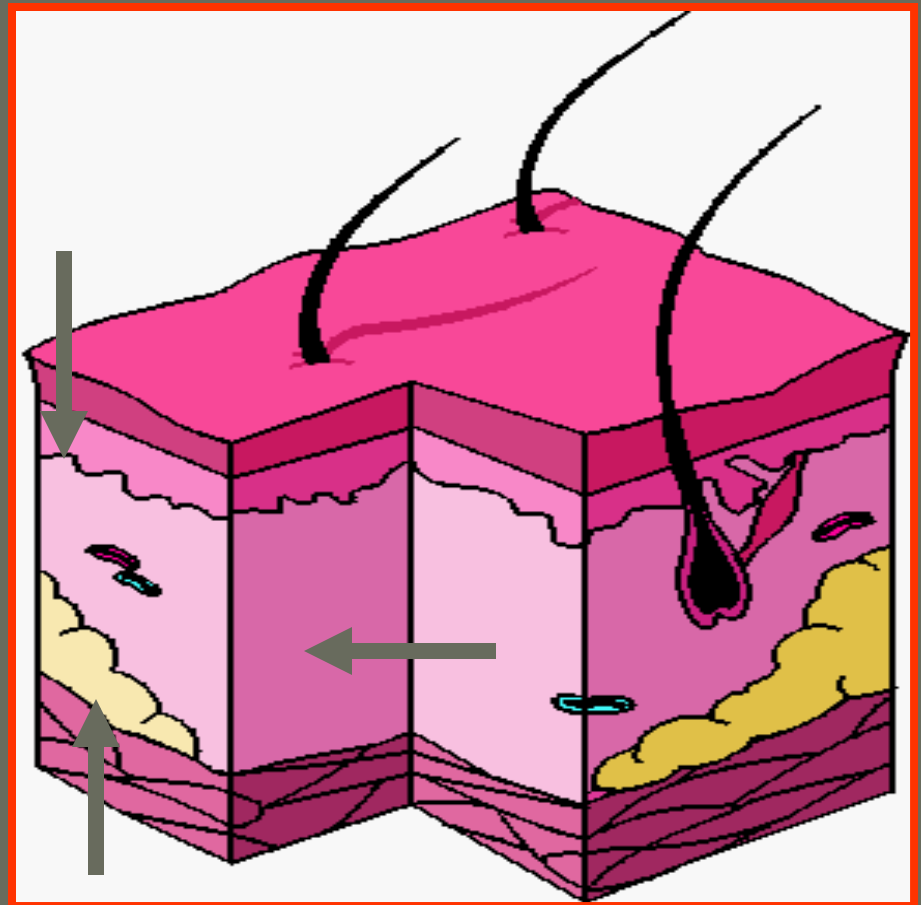
The skin is the protective barrier against the environment:

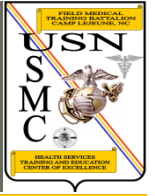
- Prevents fluid loss
- Helps regulate body temperature
- Prevents infection

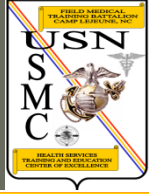
ANATOMY OF THE SKIN cont.

Composed of 3 layers

- Epidermis
- Dermis
- Subcutaneous







TYPES OF BURNS

- THERMAL
- ELECTRICAL
- CIRCUMFERENTIAL
- RADIATION
- CHEMICAL



THERMAL BURNS



- Most common type on the battlefield
 - Flame/Incendiary weapons
 - Munitions
 - Blasts
- These weapons burn at very high temperatures



THERMAL BURNS

- Primary effect of these weapons:
 - Expose the body to superheated gases and flames that cause severe burns



THERMAL BURNS

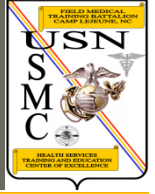
- Strong potential for airway burns
 - Personnel in bunkers, ship compartments, or armored vehicles



THERMAL BURNS



Airway burns may result in rapid life-threatening swelling and obstruction of the upper airway.



TYPES OF BURNS

- THERMAL
- ELECTRICAL
- CIRCUMFERENTIAL
- RADIATION
- CHEMICAL

ELECTRICAL BURNS



- May be more severe than expected
- Small entrance and exit wounds
 - Large area of tissue damage below the surface and along the path of the current

ELECTRICAL BURNS

- Degree of damage is related to:
 - Amount of current
 - Duration of exposure



Electrical burn on hand and arm.

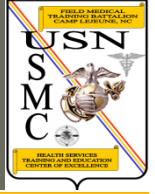


Contact electrical burns. The knee on the left was energized, and the knee on the right was grounded.

ELECTRICAL BURNS

- Large release of chemicals from destroyed muscle.
 - Cardiac arrhythmias
 - Kidney failure





TYPES OF BURNS

- THERMAL
- ELECTRICAL
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CIRCUMFERENTIAL BURNS

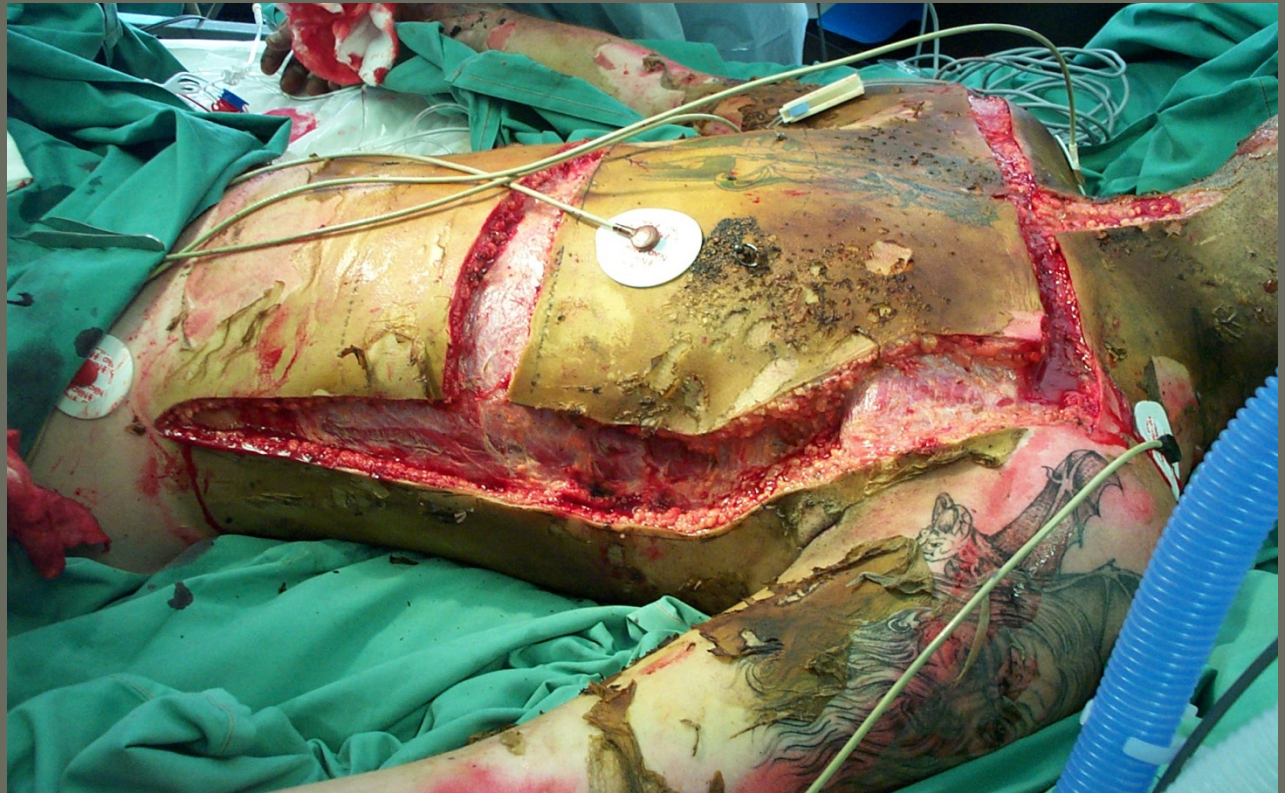


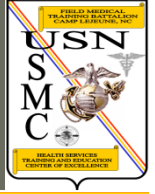
- Burn that encircles the trunk of the body or an extremity.
 - Can produce life or limb threatening condition.
 - Create tourniquet like effect.



CIRCUMFERENTIAL BURNS

- Circumferential chest burns can constrict causing casualty to suffocate.
- Escharotomies are surgical incisions made to allow expansion.





TYPES OF BURNS

- THERMAL
- ELECTRICAL
- CHEMICAL
- RADIATION
- CHEMICAL

RADIATION BURNS

- Associated with nuclear blasts
- Exposed skin is burned by infrared rays emitted at detonation
- Clothing/Shelter offer some protection
- Secondary 1st & 2nd degree burns
- Secondary source burns
- Systematic effects



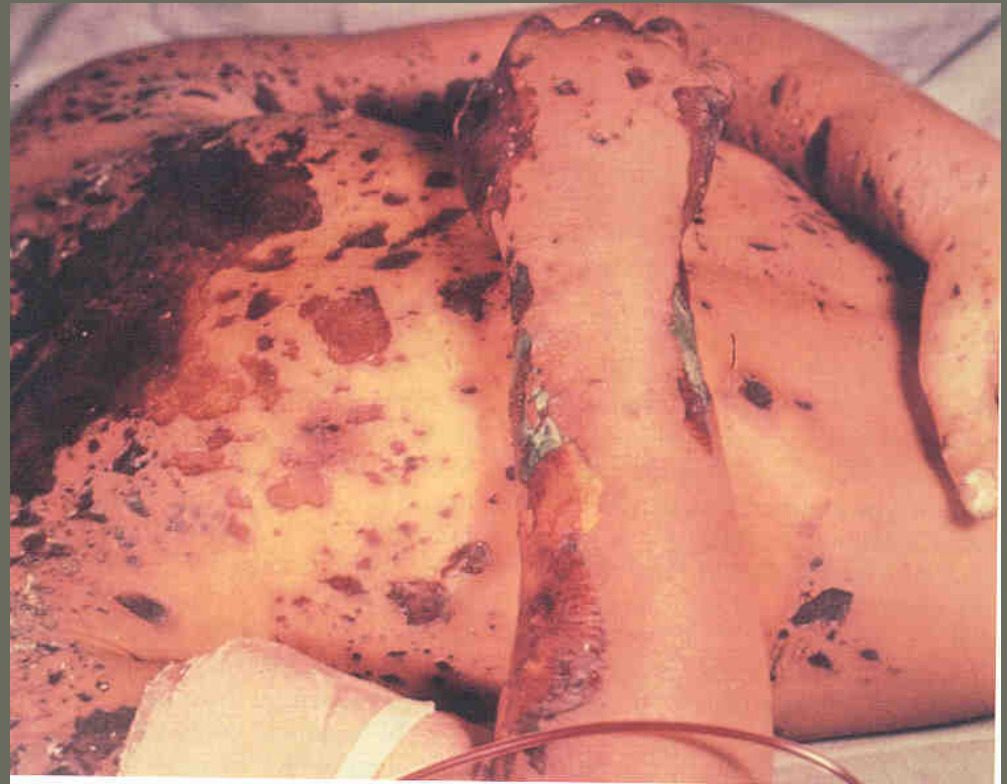


TYPES OF BURNS

- THERMAL
- ELECTRICAL
- CHEMICAL
- RADIATION
- CHEMICAL

CHEMICAL BURNS

- Occurs when skin contacts a chemical agent
 - Direct chemical destruction of tissue
 - Alkalis, Acids, Organic, Blister

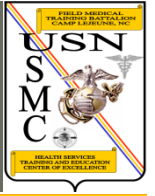


CHEMICAL BURNS

Acid Burns



Alkali Burns

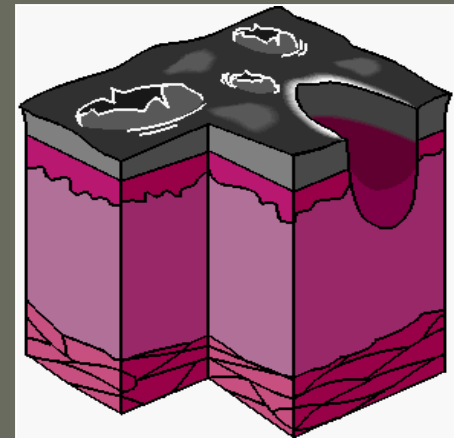
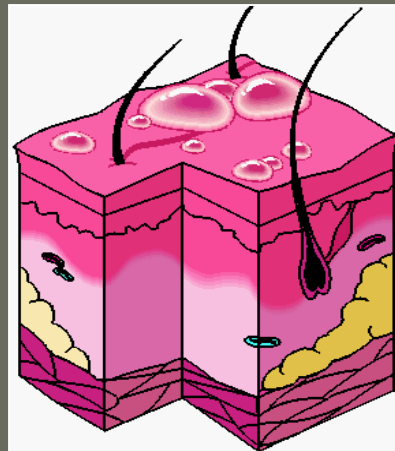
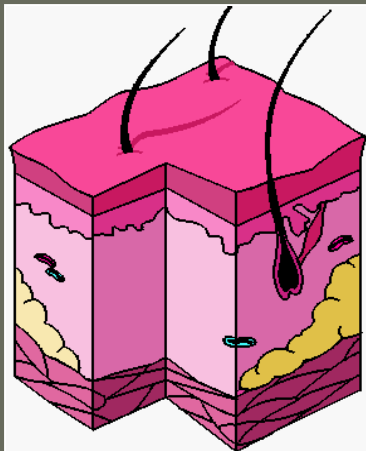




DEGREE OF BURNS

DEPTH OF BURNS

- Burn depth is classified by how deeply the skin is damaged. Often can't determine until 24-48 hours after burn.
 - 1st Degree (Superficial)
 - 2nd Degree (Partial Thickness)
 - 3rd Degree (Full Thickness)
 - 4th Degree (Complete)



1ST DEGREE (SUPERFICIAL)

- Involves only the epidermis
- Signs and Symptoms
 - Painful to touch
 - Erythematous skin
 - Blanching with pressure
 - Minimal swelling



2ND DEGREE (PARTIAL THICKNESS)

- Epidermis destroyed and dermis damaged
- Signs and Symptoms
 - Deep, intense pain
 - Moist and reddened skin
 - Blisters or open weeping wounds
 - Moderate edema, possible fluid loss



3RD DEGREE (FULL THICKNESS)

- All layers of skin have been damaged
- Signs and Symptoms
 - Pain at periphery, no pain near center
 - Dry, leathery appearance
 - Color range (Pale Yellow, Cherry Red or charred)

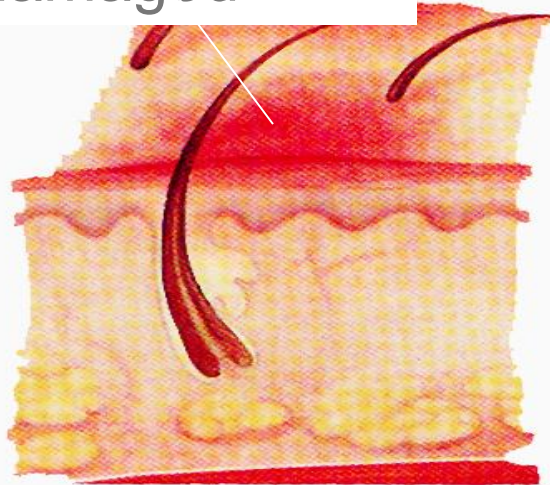


3RD DEGREE (FULL THICKNESS)

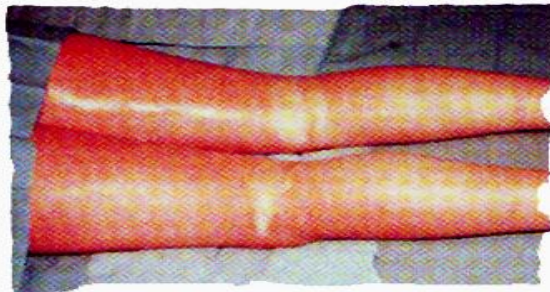
- Signs and Symptoms (cont.)
 - 1st and 2nd Degree burns around periphery
 - No blanching or capillary refill



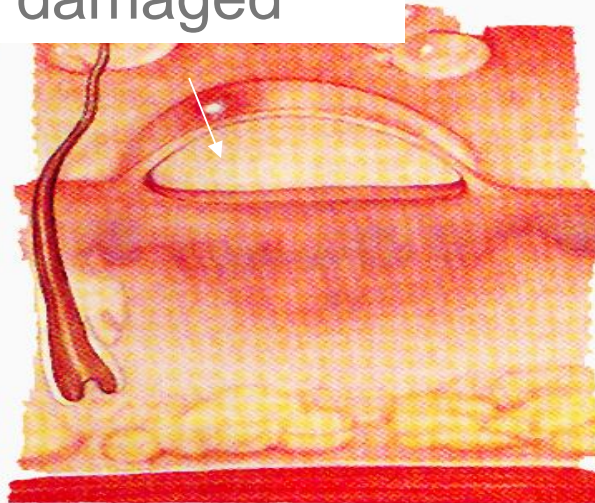
Epidermis
damaged



1st Degree



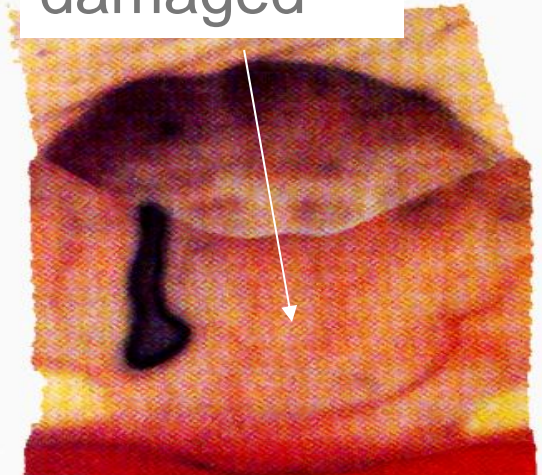
Dermis
damaged



2nd Degree

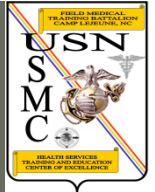


All layers
damaged



3rd Degree

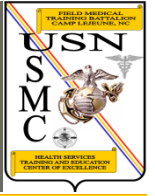


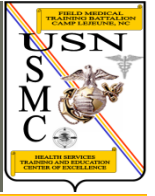


4th DEGREE BURNS

Burns that penetrate all layers of skin and muscles, fat, bone, and internal organs.







BURN SIZE

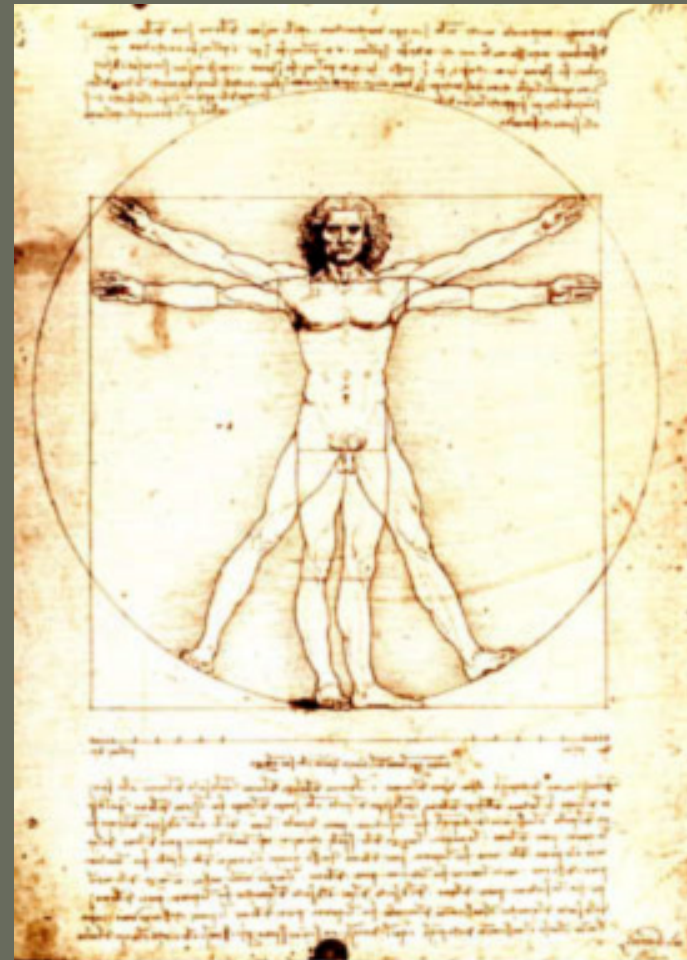
BURN SIZE ESTIMATION

- Burns are categorized by the percentage of body surface that is damaged
- Important for calculating fluid replacement needs



BURN SIZE ESTIMATION

- Two Methods
 - Rule of Nines
 - Rule of Palms



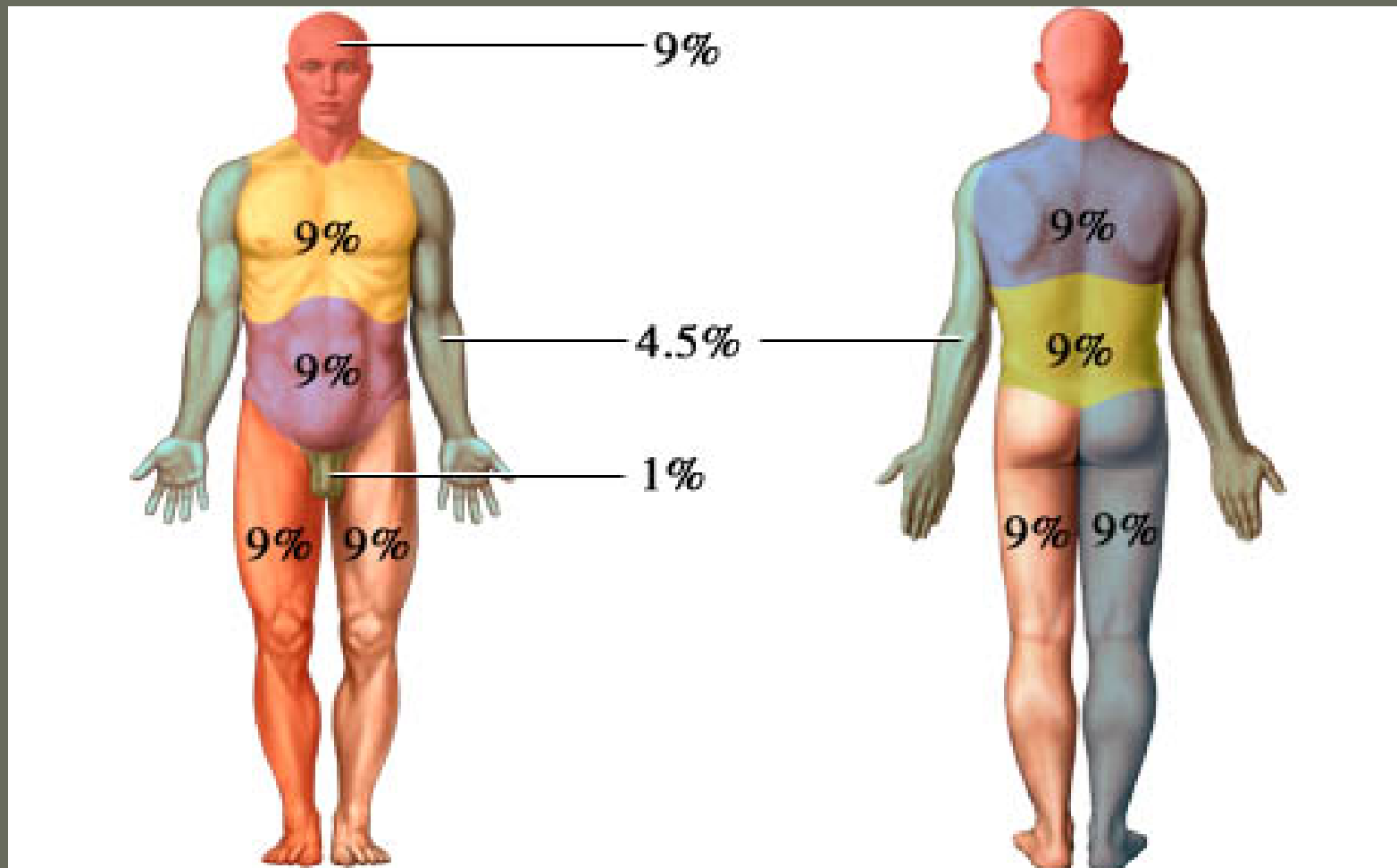


RULE OF NINES



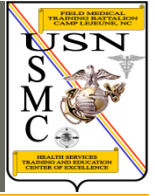
- Divides TBSA into areas of multiples of 9%
- Except the groin which is equal to 1%
- Useful for adults and children over the age of 10

RULE OF NINES





RULE OF PALMS

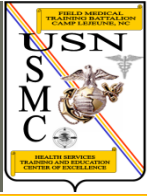


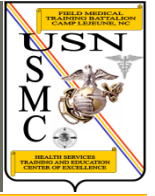
- Assumes the *PALM* of the patient represents approximately 1% of the TBSA
- The TBSA is estimated by approximating the number of “PALMS” it would take to completely cover the burn
- Useful for small or irregular burns

RULE OF PALMS

- Remember, one hand is approximately 1% of the patient's body surface area







TREATMENT OF BURNS



BURN TREATMENT



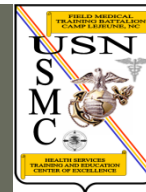
- Stop the burning
 - Water is a good method
 - Smother the flames with jacket or blanket
 - Roll the casualty on the ground
- Maintain ABC's
- Perform a Detailed Assessment
 - Skin burns are not immediately fatal, complete assessment for additional injuries and treat them appropriately



BURN TREATMENT



- Prevent Hypothermia
 - Keep PT warm!
- Estimate depth and extent burned
 - Use Rules of Nines or Palms
- Dress the burn



Step 1



Step 2

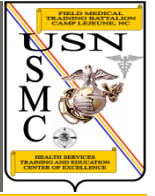
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Step 3



Step 4



FLUID RESUSCITATION



FLUID RESUSCITATION



- Hypovolemic shock will result from massive fluid shifts associated with burns.
- The FMST may not be completely responsible for the care of a burned patient, but should be aware of quick attention needed.
- Use “Parkland Formula” to calculate fluid amount.



FLUID RESUSCITATION



– Parkland Formula:

- $4\text{ml LR/NS} \times \text{Pt's wt in kg} \times \text{TBSA burned}$
- 50% given in 1st 8 hrs after burn
- Remaining 50% given over next 16 hours



FLUID RESUSCITATION



- Parkland Formula Example:
- 76 kg casualty sustained partial thickness burn to his anterior chest (9%) and abdomen (9%), entire right arm (9%), and anterior right leg (9%). The injury occurred 30 minutes ago.
- Parkland Formula: $4 \text{ ml} \times 76 \text{ kg} \times 36\% = 10,944 \text{ ml}$ (or 11 liters of LR)



FLUID RESUSCITATION



- Half of 11 liters should be administered in the first 8 hours after burn:
- In this case the casualty will need 5 ½ liters in the first 8 hours.
- The injury occurred 30 minutes ago.
- The entire 5 ½ liters should be administered over a period of 7 ½ hours



FLUID RESUSCITATION



- The remainder is administered over the following 16 hours
- $5 \frac{1}{2}$ (5,500 mL) liters divided by 16 = 343 mL per hour for the next 16 hours.



FLUID RESUSCITATION

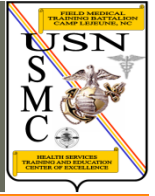


Rule of 10:

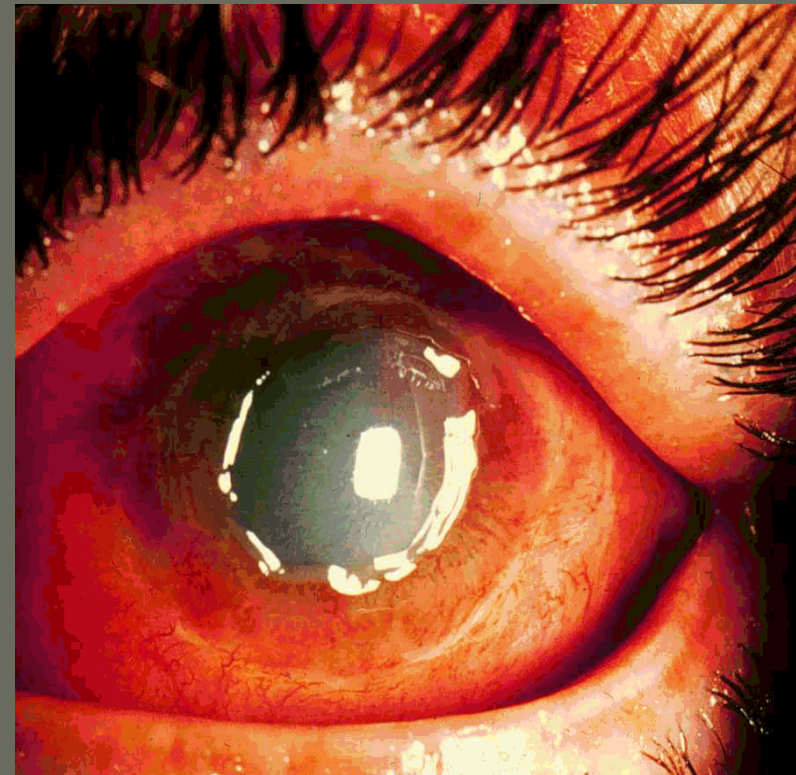
- Simplifies the process.
- Percent BSA burned is rounded to the nearest 10.
 - For example, a burn of 36% would be rounded to 40%.
- The percent burn is then multiplied by 10 to get the number of mL per hour.
- 40×10 equaling 400 mL per hour.
- This formula is used for adults weighing 40 to 70 kg. For each 10kg in body weight over 70kg, an additional 100 mL per hour is given.



BURN TREATMENT



- Assess and treat burns to the eyes
 - Blurry vision
 - Vision loss
 - Pain
 - Tearing
 - Conjunctival erythema



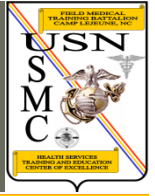
BURN TREATMENT

- Treatment of burns to the eye
 - Irrigate with copious amounts of fluid
 - Cover with dry, sterile dressing
 - If patient can see and can ambulate, do not dress the eye
 - Avoid dressing both eyes, if only one is burned





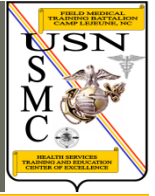
BURN TREATMENT



- If TACEVAC is delayed
 - Clean the burn with Betadine and 4x4, then rinse with saline
 - Remove loose nonviable tissue
 - Apply Silvadene and cover with loose, dry, sterile dressing
 - Clean and reapply with fresh dressing every 24 hours



CRITICAL BURNS



Critical regardless of depth or TBSA affected:

- Inhalation injuries
- Partial thickness burns $> 10\%$ of the TBSA
- Full thickness burns in any age group
- Any burn involving face, hands, feet, genitalia, perineum, or major joints.



CRITICAL BURNS (cont'd)



Critical regardless of depth or TBSA affected:

- Electrical burns, including lightning injury
- Chemical burns
- Injuries of the respiratory tract, other soft tissue injuries, and musculoskeletal injuries

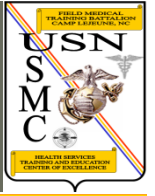


PAIN MANAGEMENT



Pain management

- Should be provided to burn victims, and small doses of narcotics should be titrated intravenously.
- Vital signs and respiratory effort are monitored for potential adverse effects. (Note: The use of narcotics is contraindicated in head and spinal trauma.)
- Water immersion may be applied for 10-15 minutes for pain relief, however, caution should be used as it may intensify shock.





MANAGE BURN CAUALTIES

