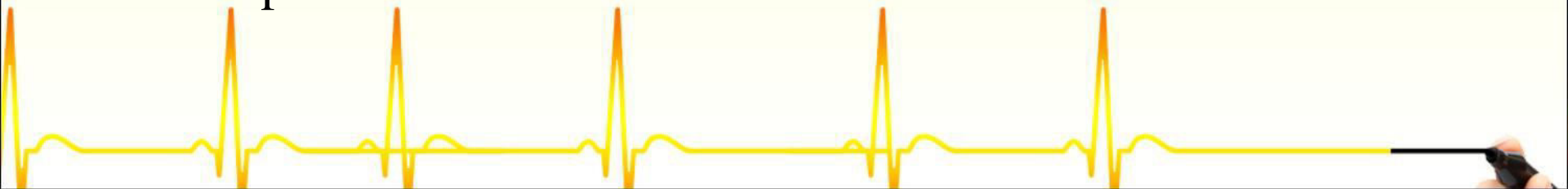

burn®

BURN

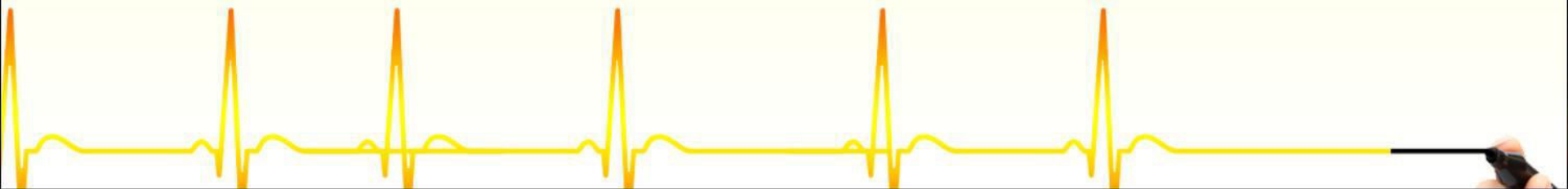
Burns are tissue damage that results from heat, overexposure to the sun or other radiation, or chemical or electrical contact. Burns can be minor medical problems or life-threatening emergencies.

The treatment of burns depends on the location and severity of the damage. Sunburns and small scalds can usually be treated at home. Deep or widespread burns need immediate medical attention. Some people need treatment at specialized burn centres and months long follow-up care.



Burns

- Burns are caused by transfer of energy from heat source to body such as heat, chemicals, electrical current, or radiation.
- The depth of the injury depends on the temperature of burning agent and duration of contact with it.



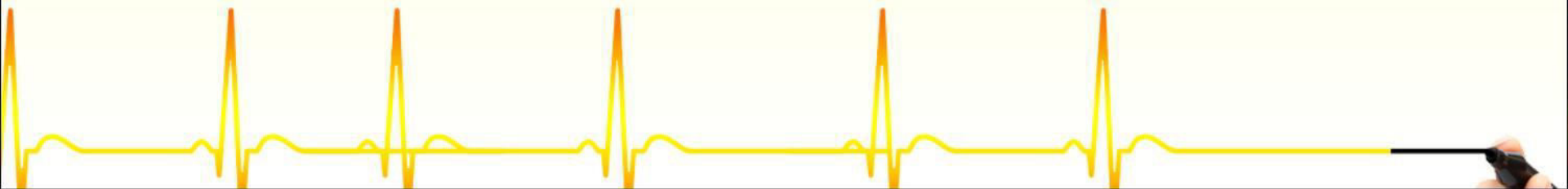
TYPES OF BURNS

1) Thermal

2) Radiation

3) Chemical

4) Electrical



THERMAL:

- Caused by external heat source which raises the temperature of skin and deeper tissue to a level that causes cell death and protein coagulation
- Examples: Flame, hot objects or gases touching skin, scalding liquids

RADIATION

- Caused by prolonged or intense exposure to ultraviolet radiation

- Examples: Sunburn, tanning beds

ELECTRICAL

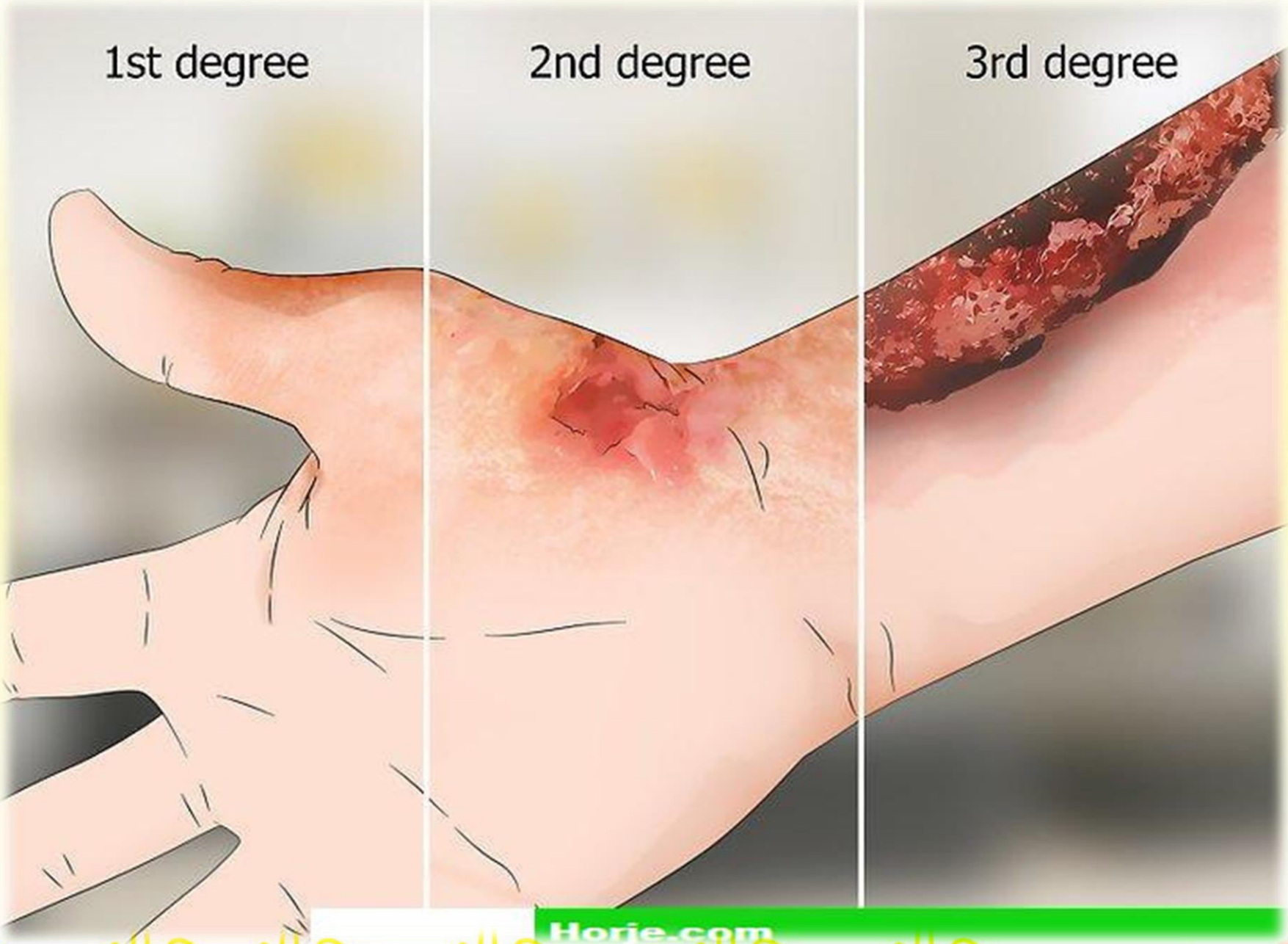
- Contact with live current

- Damage more severe than external injury

CHEMICAL:

- Contact with strong acid or alkaline substance **such as H_2SO_4 , Nitric Acid, Hcl, Caustic Soda, Potash, Ammonia or quick lime & Gases like Liquid O_2 or Nitrogen**
  - Alkali burns more difficult to manage, Alkali adhere to tissue. Need copious flushing
  - Skin penetration – systemic toxicity
  - Neutralizing agent/H2O
  - Acid- H2O lavage, brush off powder, then H2O flush for several hours

Chemical Burn


1st degree
2nd degree
3rd degree
Horje.com

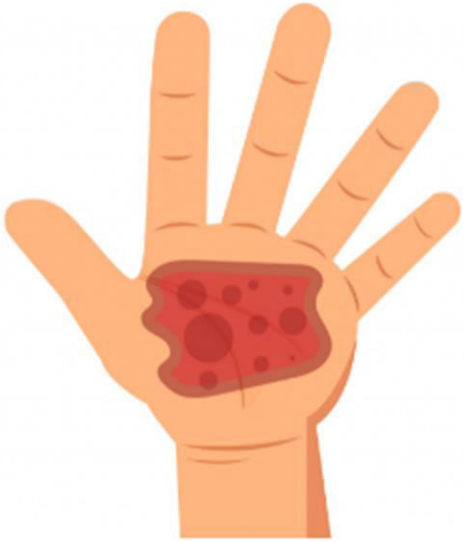
TYPES OF BURNS

FIRST-DEGREE
Superficial

Cause damage to the first layer of the skin only. Area will be red and painful. E.g. sunburn.

SECOND-DEGREE
Partial thickness

Cause damage to the first and second layer of the skin. Area will be red, peeling, blistered and swelling with clear or yellow-coloured fluid.



THIRD-DEGREE
Full thickness

Cause damage to the first and second layers, plus underlying tissue. Burn site appears black or charred with white exposed fatty tissue. Nerves are destroyed and pain will not be as strong.

Degree of Burn & Symptoms

- Burn symptoms vary depending on how deep the skin damage is. It can take a day or two for the signs and symptoms of a severe burn to develop.

- **1st-degree burn :-**

. This minor burn affects only the outer layer of the skin (epidermis). It may cause redness and pain.

Cont….

- First-degree burns cause minimal skin damage. They are also called “superficial burns” because they affect the outermost layer of skin. Signs of a first-degree burn include:
- redness
- minor inflammation, or swelling
- pain
- dry, peeling skin occurs as the burn heals

Cont….

- Since this burn affects the top layer of skin, the signs and symptoms disappear once the skin cells shed. First-degree burns usually heal within 7 to 10 days without scarring.
- Patient should still seedoctor if the burn affects a large area of skin, more than three inches, and if it's on face or a major joint, which include:
- knee
- Ankle, Foot, spine, shoulder, elbow, forearm

Cont….

- First-degree burns are usually treated with home care. Healing time may be quicker the sooner treat the burn. Treatments for a first-degree burn include:
- soaking the wound in cool water for five minutes or longer
- taking acetaminophen or ibuprofen for pain relief
- applying lidocaine (an anesthetic) with aloe vera gel or cream to soothe the skin
- using an antibiotic ointment and loose gauze to protect the affected area

Cont….

- Make sure you don’t use ice, as this may make the damage worse.
- Never apply cotton balls to a burn because the small fibers can stick to the injury and increase the risk of infection.
- Also, avoid home remedies like butter and eggs as these are not proven to be effective.

- **2nd-degree burn :-**
- This type of burn affects both the epidermis and the second layer of skin (dermis).
- It may cause swelling and red, white or splotchy skin.
- Blisters may develop, and pain can be severe.
- Deep second-degree burns can cause scarring.

Cont….

- Second-degree burns are more serious because the damage extends beyond the top layer of skin. This type burn causes the skin to blister and become extremely red and sore.
- Some blisters pop open, giving the burn a wet or weeping appearance. Over time, thick, soft, scab-like tissue called fibrinous exudate may develop over the wound.
- Due to the delicate nature of these wounds, keeping the area clean and bandaging it properly is required to prevent infection. This also helps the burn heal quicker.

Cont….

- Some second-degree burns take longer than three weeks to heal, but most heal within two to three weeks without scarring, but often with pigment changes to the skin.
- The worse the blisters are, the longer the burn will take to heal. In some severe cases, skin grafting is required to fix the damage. Skin grafting takes healthy skin from another area of the body and moves it to the site of the burned skin.
- As with first-degree burns, avoid cotton balls and questionable home remedies. Treatments for a mild second-degree burn generally include:

Cont….

- running the skin under cool water for 15 minutes or longer
- taking over-the-counter pain medication (acetaminophen or ibuprofen)
- applying antibiotic cream to blisters
- However, seek emergency medical treatment if the burn affects a widespread area, such as any of the following:
- face
- hands
- Buttocks, groin
- feet

3rd-degree burn.

- This burn reaches to the fat layer beneath the skin.
- Burned areas may be black, brown or white.
- The skin may look leathery.
- Third-degree burns can destroy nerves, causing numbness.

Cont….

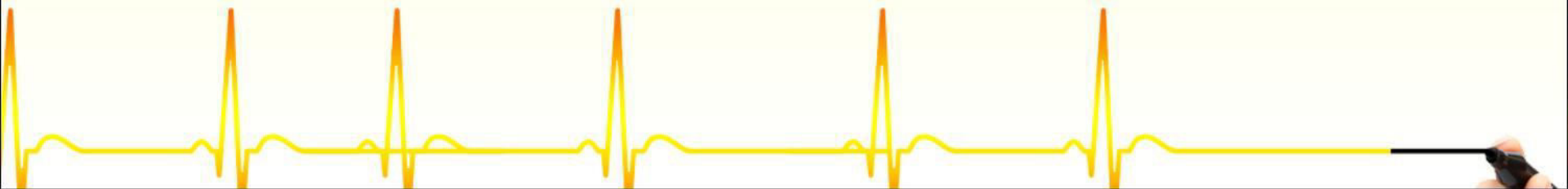
- Excluding fourth-degree burns, third-degree burns are the most severe. They cause the most damage, extending through every layer of skin.
- There is a misconception that third-degree burns are the most painful.
- However, with this type of burn the damage is so extensive that there may not be any pain because of nerve damage.
- Depending on the cause, the symptoms third-degree burns can exhibit include:

Cont….

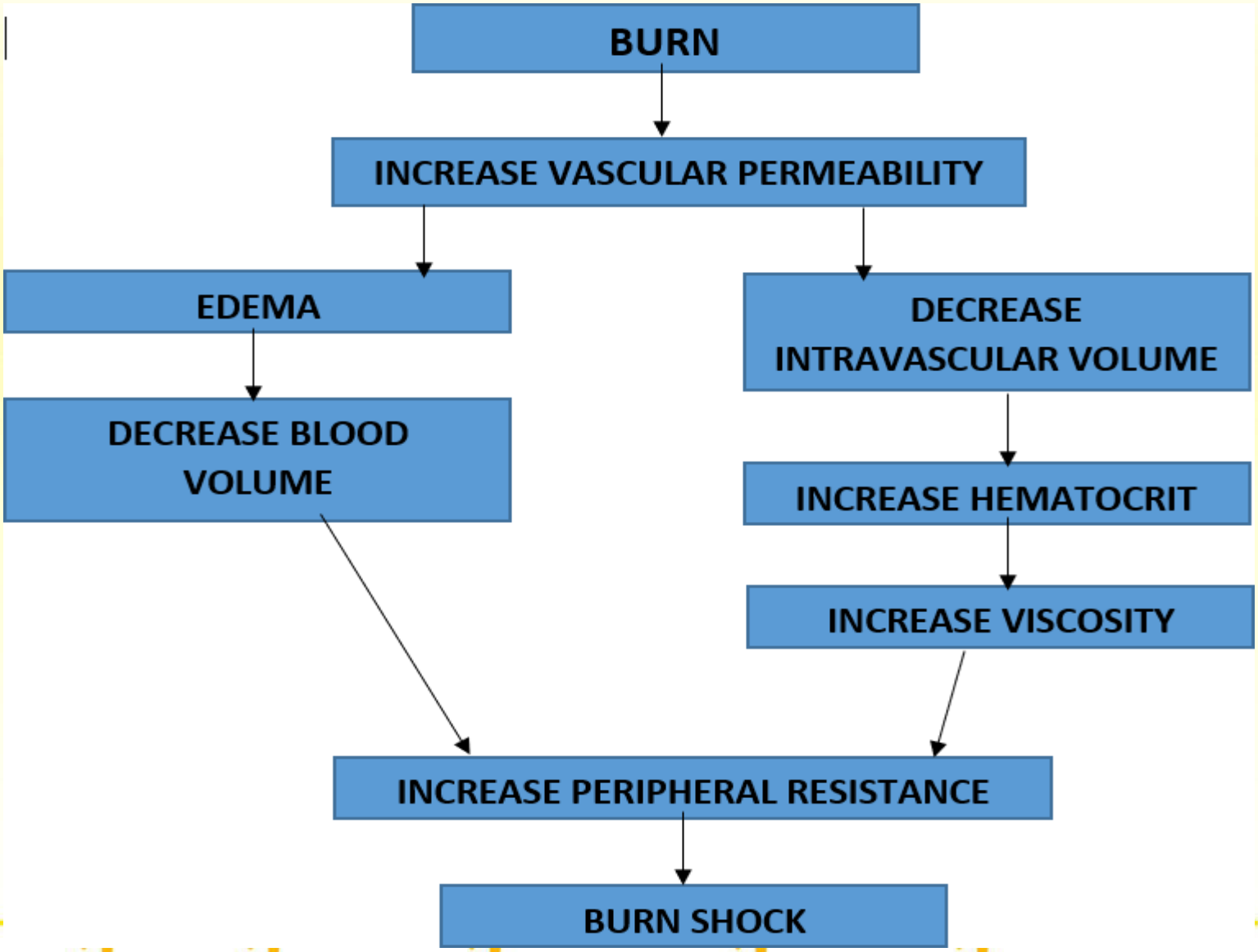
- waxy and white color
- char
- dark brown color
- raised and leathery texture
- blisters that do not develop
- Without surgery, these wounds heal with severe scarring and contracture. There is no set timeline for complete spontaneous healing for third-degree burns

Cont….

- Never attempt to self-treat a third-degree burn. **Call 108 immediately**.
- While you're waiting for medical treatment, raise the injury above your heart.
- Don't get undressed, but make sure no clothing is stuck to the burn.

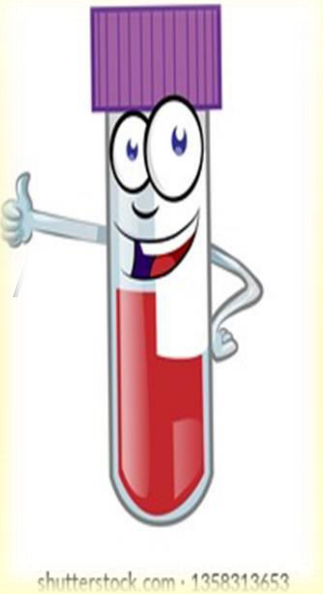


Pathophysiology



LAB INVESTIGATIONS

- COMPLETE BLOOD COUNT
- SERUM ELECTROLYTE –



✓Potassium level initially elevated due to injured RBC destruction renal function.

✓Hypokalemia when diuresis start.

✓Magnesium level may be decreased.

✓Sodium level initially decreased with body water loss.

✓Hypernatremia occurs later as renal conservation occurs.

•ALKALINE PHOSPHATE – elevated due to interstitial fluid shift / impairment of sodium.

•SERUM ALBUMIN – albumin / globulin ratio may reserve as result of loss of protein in edema fluid.

• SERUM GLUCOSE – elevation reflects stress response.

•BUN / CR – elevation (decrease renal perfusion / tissue injury)

•URINE – presence of albumin, hemoglobin & myoglobin indicates deep tissue damage.

- RADIOLOGIC EXAMINATION
- CHEST X-RAY – inhalation injury
- FIBEROPTIC BRONCHOSCOPE - in inhalation injury findings -edema & hemorrhage.
- LUNG SCAN
- ELECTROCARDIOGRAM (MI)

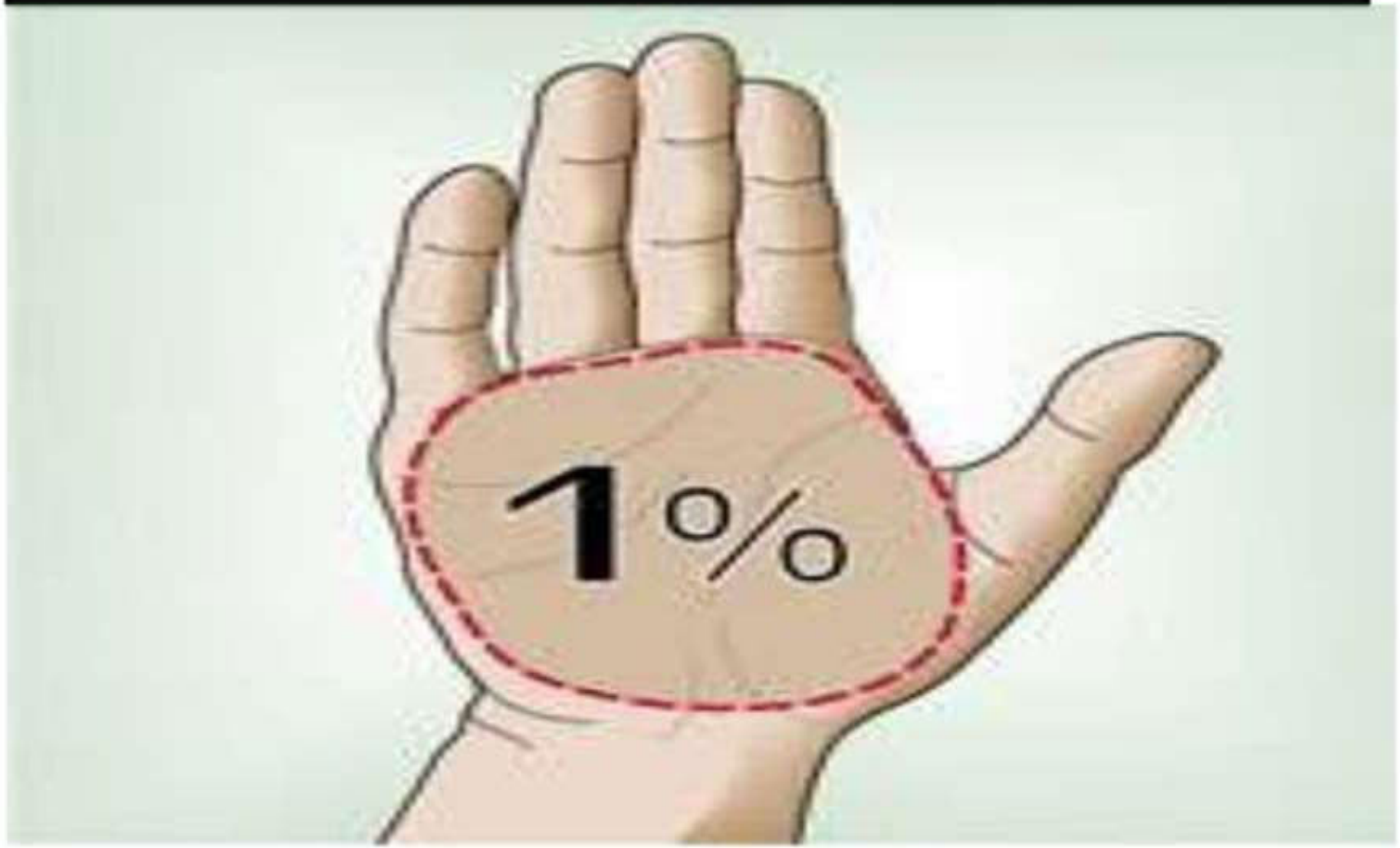
ASSESSMENT OF BURNS

- Palmer Method
- Wallace Rule of Nine
- Lund and Browder method

Palmer Method

- This method used the patient's hand - size to estimate the percent TBSA of small burns.
- The palmer surface of the hand (palm and fingers) equals roughly 1% TBSA in all age groups

AREA OF PALM = 1% BODY SURFACE AREA



WALLACE RULE OF NINE

Rule of Nines :-

- The rule of nines is a method doctors and emergency medical providers use to easily calculate the treatment needs for a person who's been burned.

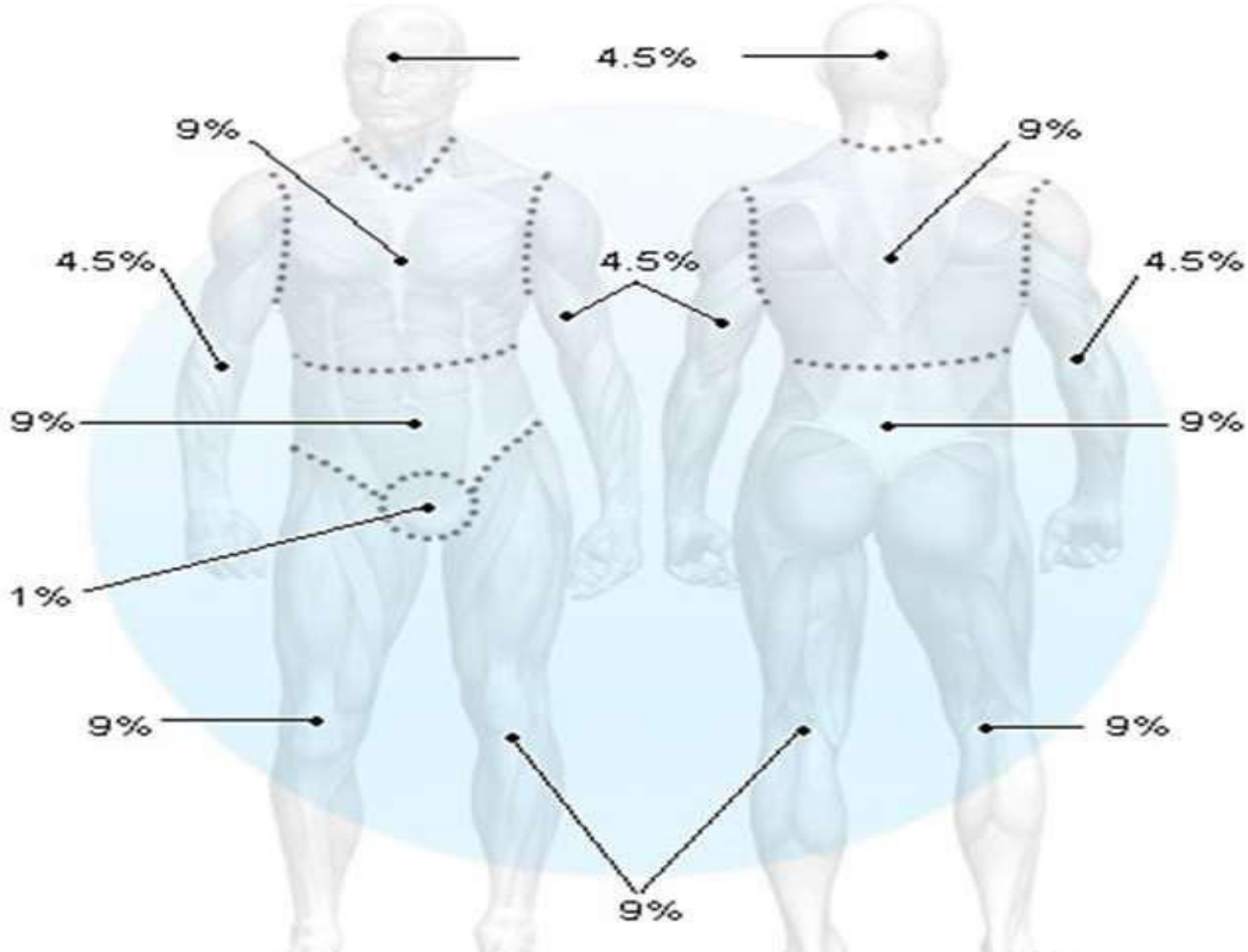
- It's sometimes referred to as the Wallace rule of nines after Dr. Alexander Wallace, the surgeon who first published the method. The creation of this method is credited to Pulaski and Tennison.

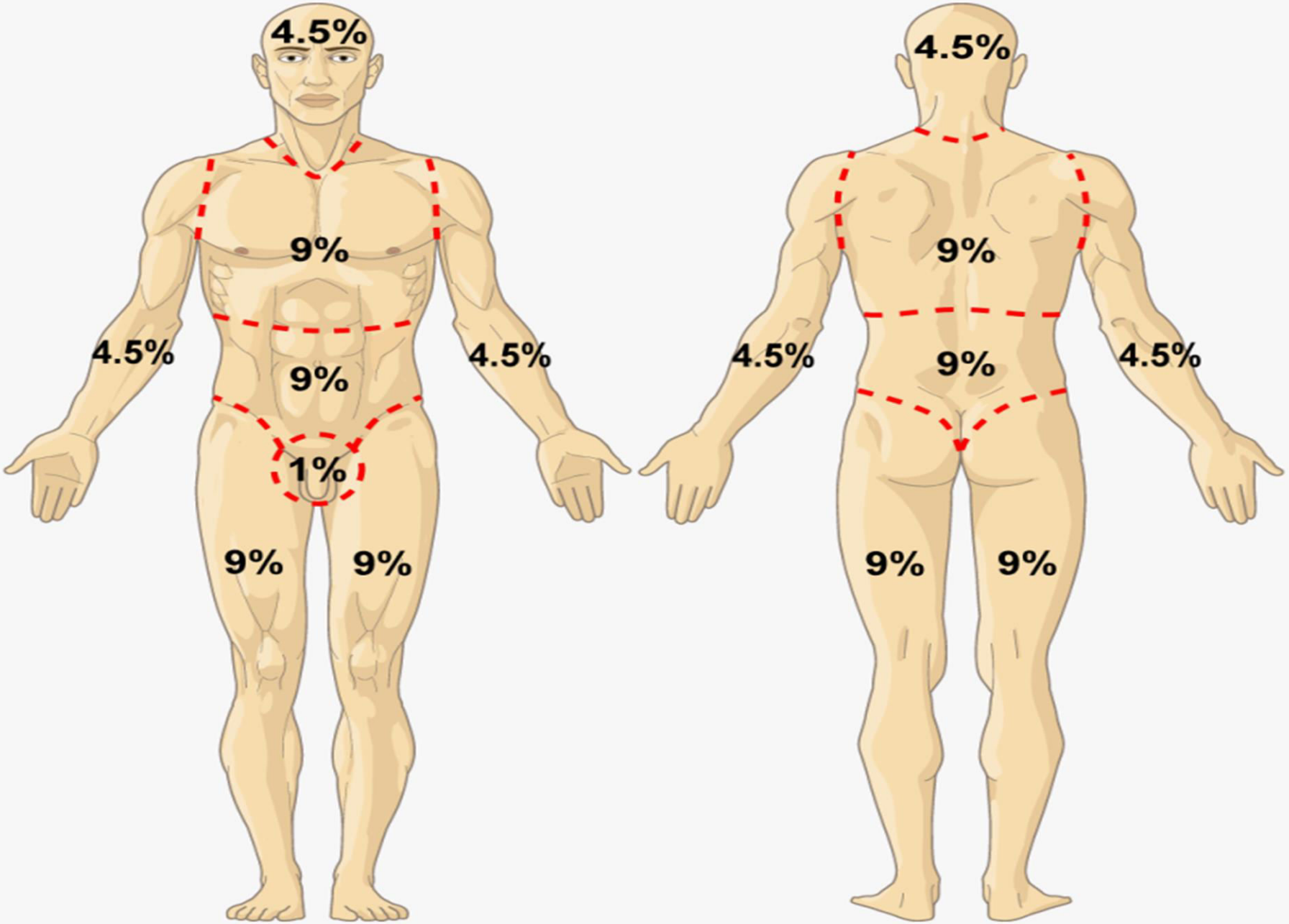
Cont….

- The rule of nines is meant to be used for:
- second-degree burns, also known as partial-thickness burns
- third-degree burns, known as full-thickness burns
- The rule of nines assigns a percentage that's either nine or a multiple of nine to determine how much body surface area is damaged. For adults, the rule of nines is:

BODY PART	PERCENTAGE
Arm (including the hand)	9 percent each
Anterior trunk (front of the body)	18 percent
Genitalia	1 percent
Head and neck	9 percent
Legs (including the feet)	18 percent each
Posterior trunk (back of the body)	18 percent

Burn Percentage in Adults: Rule of Nines




4.5%
9%
4.5%
9%
4.5%
1%
9%
9%
4.5%
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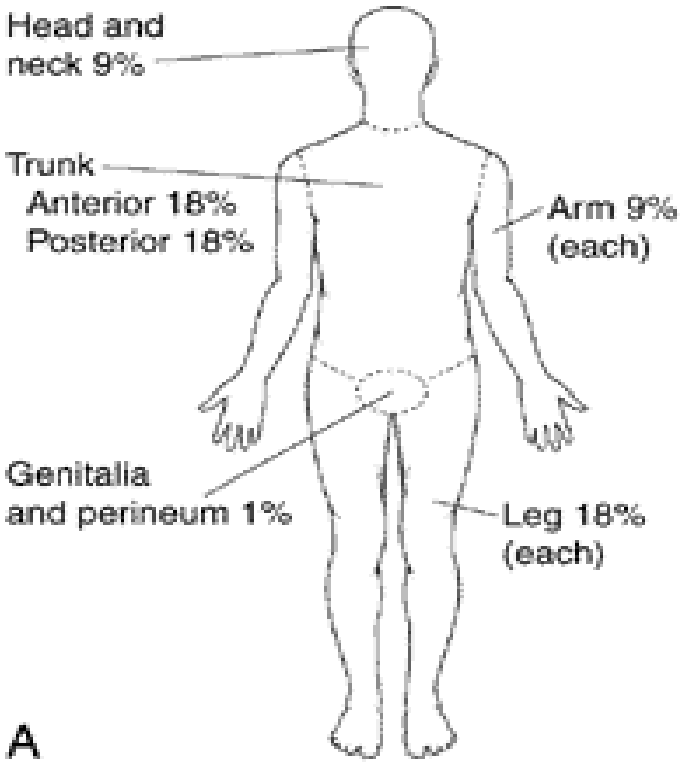
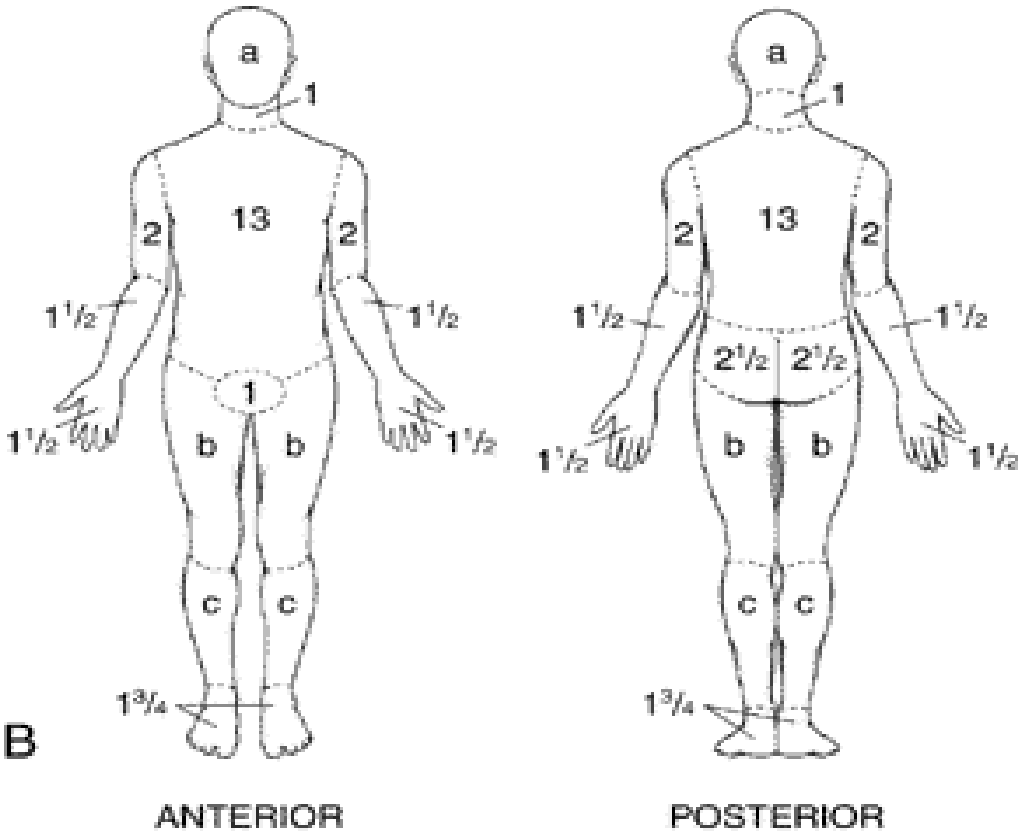
9%
9%

Estimating Percent Total Body Surface Area in Children Affected by Burns





Relative percentage of body surface areas (% BSA) affected by growth

	0 yr	*1 yr*	*5 yr*	*10 yr*	*15 yr*
a— ½ of head	9½	8½	6½	5½	4½
b— ½ of 1 thigh	2¾	3¼	4	4¼	4½
c— ½ of 1 lower leg	2½	2½	2¾	3	3¼

(A) Rule of "nines"

(B) Lund-Browder diagram for estimating extent of burns

First Aid Management For The Burns

Aims of the first aid treatment of the burns

- To prevent the infection, and further destruction of the skin.
- To preserve the safe skin, maintain its integrity.
- To reduce the anxiety of the patient.
- To immediately provide the medical assistance

STOP the burning

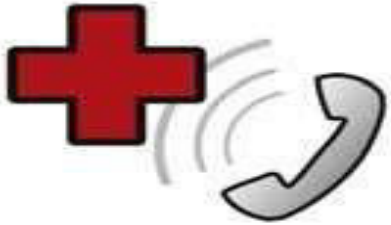
Sheffield Children's NHS
NHS Foundation Trust

First Aid for burns

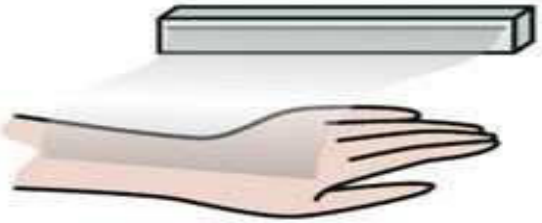
S **Strip** hot clothes & jewellery.

T **Turn on cool tap** (never use ice). Run burn under cool water for 10 minutes. Keep the rest of the person warm.

O **Organise** medical assistance (999, A&E, GP).



P **Protect** burn with cling film or clean cloth (Do not use dressings, fluffy cloth, creams or lotions).

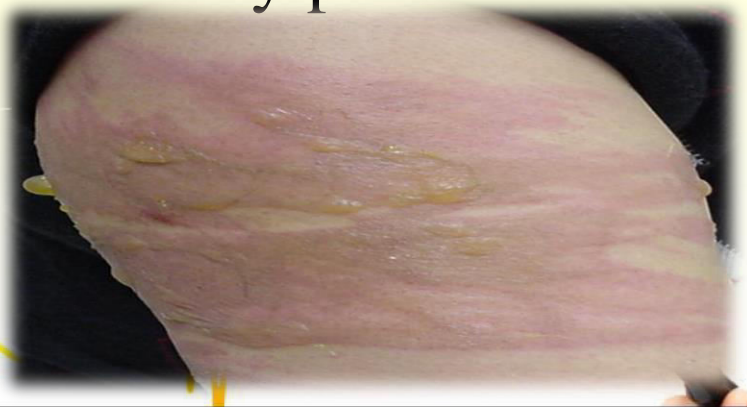


EMERGENCY MANAGEMENT

- Stop burning & remove burned clothing immediately
- Apply cold wet towels, cool water, no direct ice, cover with sterile dressing
- Wrap loosely to avoid putting pressure on burned skin
- Flush area thoroughly with water or Saline (chemical burns)
- Determine the depth of the burn
- Don't break blisters
- Remove ring, watch, bangles, belt & boots
- Apply lotion only after a burn is completely cooled
- Prevent shock
- Fluid replacement

CARE OF SMALL BURNS

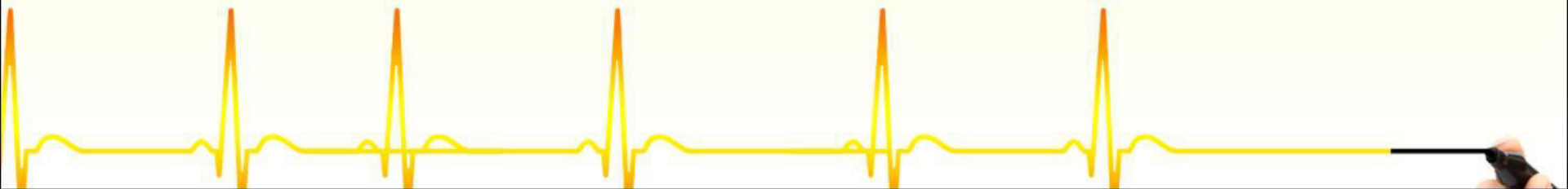
- Clean entire limb with soap and water (also under nails).
- Apply antibiotic cream
- Dress limb in position of function, and elevate it.
- No hurry to remove blisters unless infection occurs.
- Rinse daily in clean water; in shower is very practical.
- Gently wipe off with clean gauze.



MEDICAL MANAGEMENT

There are three phases of burn injury, each requiring various levels of client care. The three phases are:

- Emergent
- Intermediate
- Rehabilitative



EMERGENT PHASE

•This phase begins immediately at the time of injury and ends with the restoration of capillary permeability.

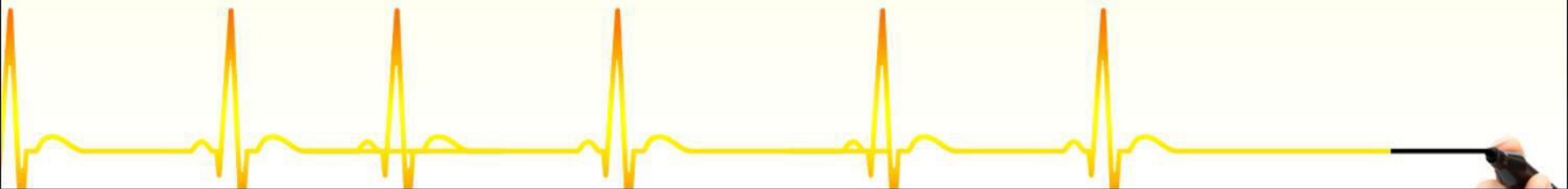
•The main goal of this phase is to prevent hypovolemic shock and preserve vital organ functioning

• Methods used during this time are pre hospital care and emergency room care.

Formulas to calculate fluid requirement

- Although there are a number of acceptable formulas for calculating fluid requirements, the Parkland formula is most often used.
- **The Parkland Formula**
- The Parkland formula for the total fluid requirement in 24 hours is as follows:
- **4ml RL x TBSA (%) x body weight (kg)**
- 50% given in first eight hours and 50% given in next 16 hours.

- **Practice Question:-**
- A patient is brought to the Emergency after having sustained burns to 27% of their body. The patient weighs 98 kgs. What must be the total amount of fluid to be given in the first 8 hours?



Evans formula:

First 24 hours:

Crystalloid 1 ml/kg/% BSA+ albumin at 1 ml/kg/% burn+2000 ml of 5% dextrose(Half over the first 8 hours and remaining half over second 16 hours) Next 24 hours: Crystalloid at 0.5 ml/kg/% burn+ albumin at 0.5 ml/kg/% burn+2000 ml of 5% dextrose

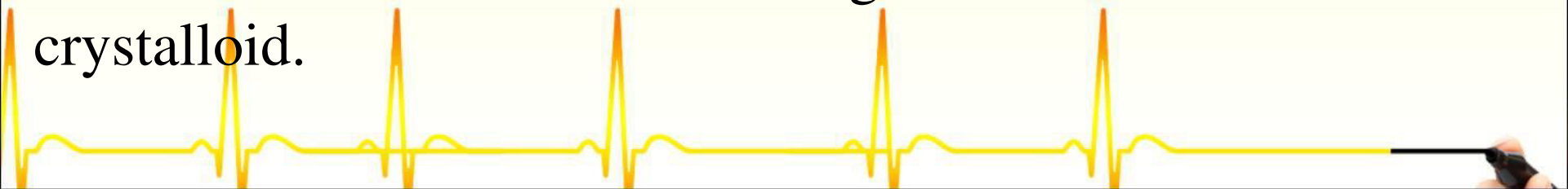
The Brooke formula:

First 24 hours:

Hartmann's (or Ringer's lactate). No colloids. 2ml/kg/% BSA

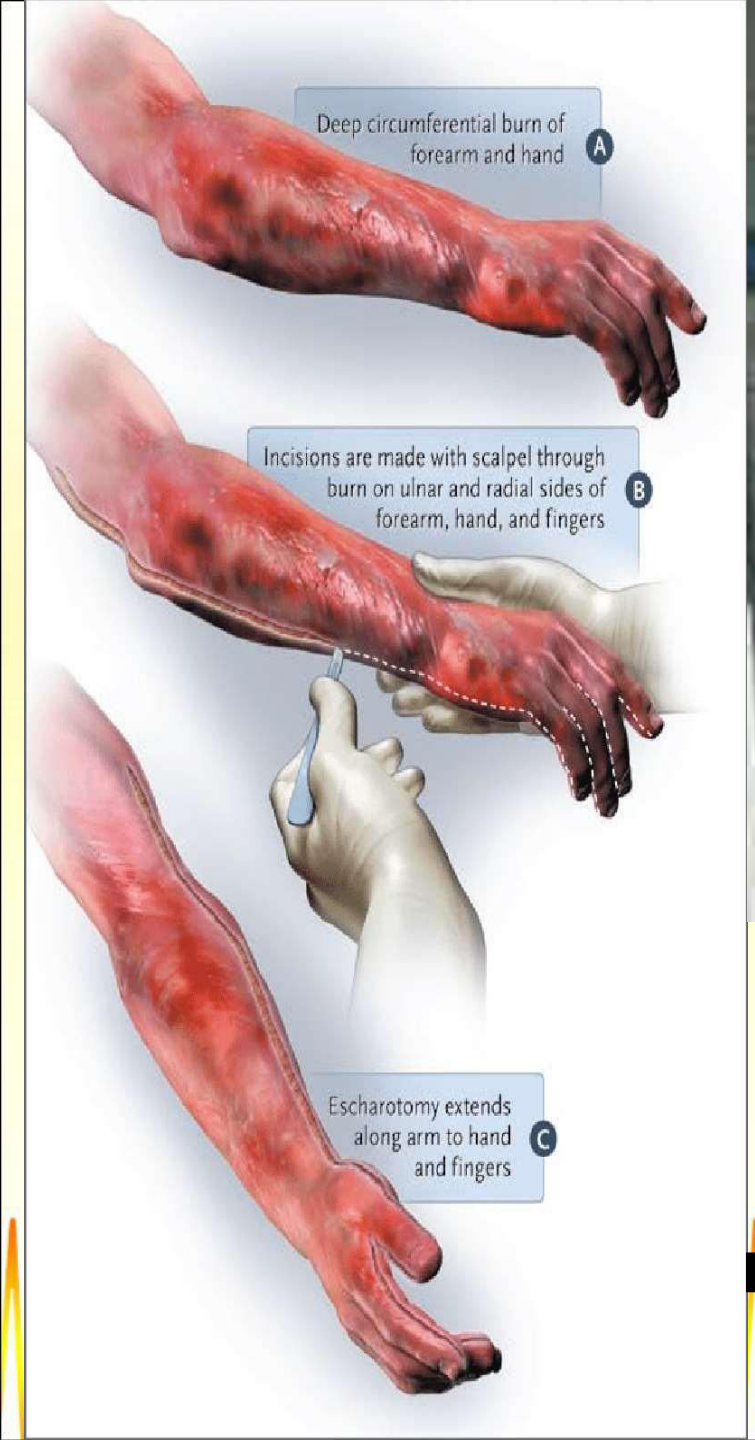
Next 24 hours:

Albumin infusion at 0.3–0.5 ml/kg/% burn. No more crystalloid.



INTERMEDIATE PHASE

- It begins about **48–72 hours** following the burn injury.
- During this time, the emphasis is placed on restoration of the patient's capillary permeability and the phase continues until the wound is totally closed.
- During the intermediate phase, attention is given to removing the **eschar** and other cellular debris from the burned area. **Debridement**, the process of removing eschar, can be done placing the client in a tub or shower and gently washing the burned tissue away with mild soap and water or by the use of enzymes, substances that digest the burned tissue.



HYDROTHERAPY CART SHOWER

ESCHAROTOMY

BIOLOGIC DRESSINGS

FISH GRAFT

AMNIOTIC MEMBRANE GRAFT

REHABILITATIVE PHASE

- This stage begins with closure of the burn and ends when the client has reached the optimal level of functioning.
- In actuality, it begins the day the client enters the hospital and can continue for a lifetime.
- In the rehabilitative phase, the focus is on helping the client return to pre-injury life.

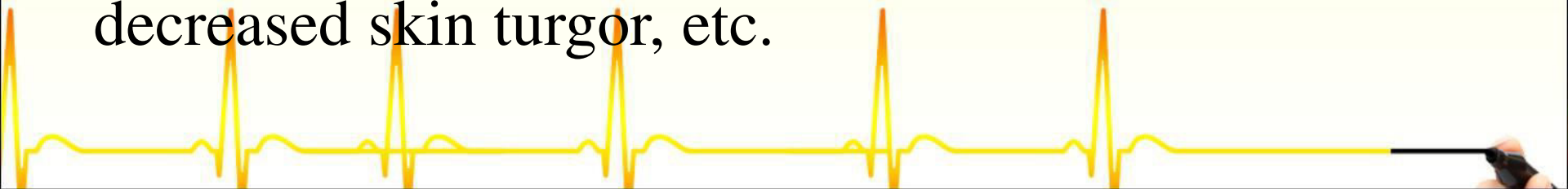
NURSING MANAGEMENT OF BURNS

- **NURSING ASSESSMENT**

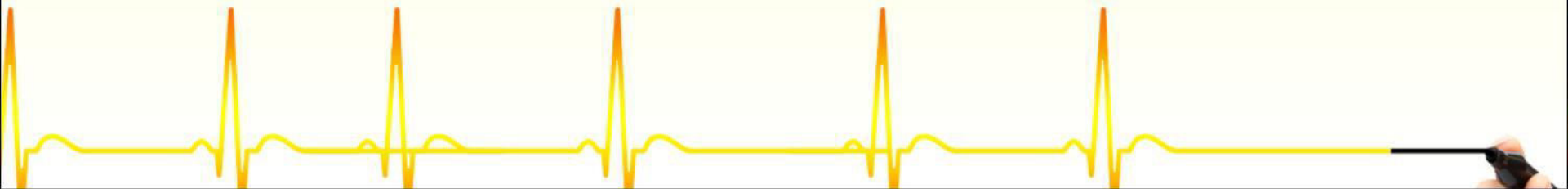
PRIMARY ASSESSMENT	SECONDARY ASSESSMENT
• Airway • Vital signs • Neurologic assessment • Skin exposure • Transport	• History • Lab investigations • Wound care • Pain and anxiety • Fluid resuscitation

NURSING DIAGNOSIS

- **1. Ineffective airway clearance** related to edema and effects of smoke inhalation as evidenced by abnormal breath sounds, dyspnea, etc.
- 2. **Impaired gas exchange** related to carbon monoxide poisoning, smoke inhalation and upper airway obstruction as evidenced by cyanosis, abnormal arterial pH, etc.
- 3. **Deficient fluid volume** related to increased capillary permeability and evaporative loss from the burn wound as evidenced by concentrated urine, decreased skin turgor, etc.



- 4.**Hypothermia** related to loss of skin microcirculation and open wounds as evidenced by body temperature below normal range, cool pale skin, etc..
- 5.**Acute pain** related to tissue and nerve injury as evidenced by verbal explanation of patient, pain scale score, etc.
- 6. **Anxiety** related to fear and the emotional impact of burn injury as evidenced by irritability, feelings of inadequacy, etc.



- Four major goals relating to burn management are prevention, institution of lifesaving measures for the severely burned person, prevention of disability and disfigurement, and rehabilitation.

Nursing Priorities

- Maintain patent airway/respiratory function.
- Restore hemodynamic stability/circulating volume.
- Alleviate pain.
- Prevent infection.
- Wound care.
- Prevent complications.
- Provide emotional support for patient/significant other (SO).
- Provide information about condition, prognosis, and treatment.

SCAR MANAGEMENT

PRESSURE GARMENTS

Almost universally used

Apparently effective

Many published observations

SILICON GEL

COMPLICATIONS OF BURNS

- Infection
- Low blood volume
- Dangerously low body temperature
- Compartment syndrome
- Breathing problems [Inhalation injury]
- Scarring
- Bone and joint problems
- Shock
- Heat exhaustion and heatstroke

PREVENTION OF BURNS

Child Burn Prevention Tips

Burn Prevention

Protect your child from scalds and burns

Lower your hot water temperature to 49˚C/120˚F.

Keep hot drinks away from your child.

Make sure your child is safe in the kitchen.

Stay with your child during bath time.

Be Safe throughout the House

1. Use electrical outlet covers.
2. Unplug electrical appliances when not in use.
3. Install an appropriate number of smoke detectors – one near each bedroom, one at the top of each stairway and one near the planned escape route.
4. Teach your children that matches are a tool, and not a toy.
5. Keep matches out of reach of younger children, and allow older children to use them only when supervised.
6. Store all chemicals and cleaners out of reach of children, or lock the cabinet.
7. Replace damaged electrical cords.
8. Have the fireplace and chimney inspected every year before the cold weather season.
9. Do not leave lighted candles unattended.
10. Store all flammable liquids properly.

Shriners Hospitals for Children®

Burn Awareness
Preventing Burn Injuries

Strata graft

THANK YOU