



Burns

Tarek Abulezz

OBJECTIVES

- **What is Burn ?**
- **Causes of Burns**
- **Assessment of burn injury**
- **Management of burn victim**
- **Burn wound care & complications**

Definition

Burn is a **coagulative necrosis** of tissues (mainly the skin) induced by **Thermal energy**, such as heat, chemicals, electricity or radiation.

Skin Anatomy

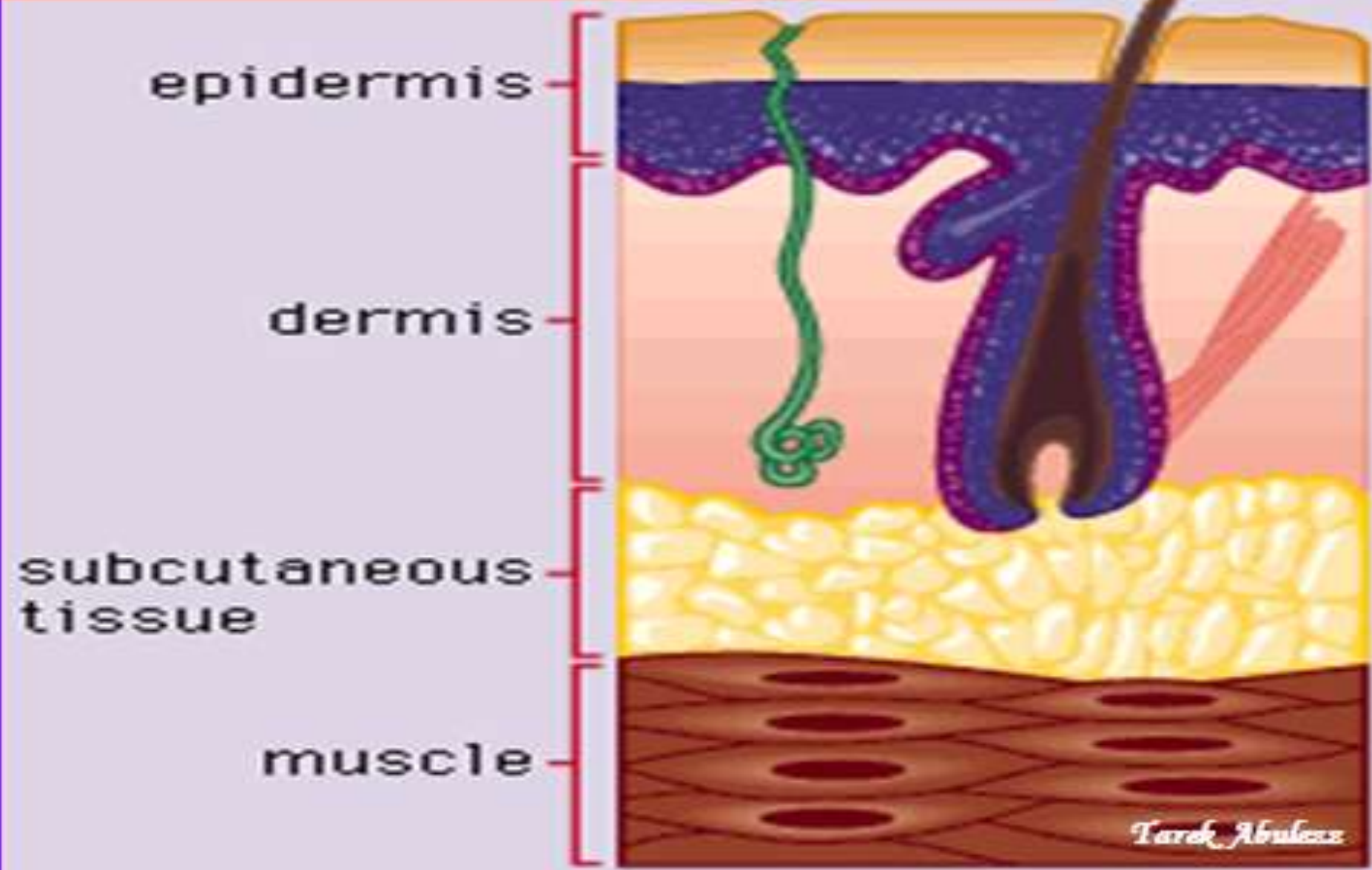
Skin is the largest organ in the body (**17% of body weight**).

Layers of the skin

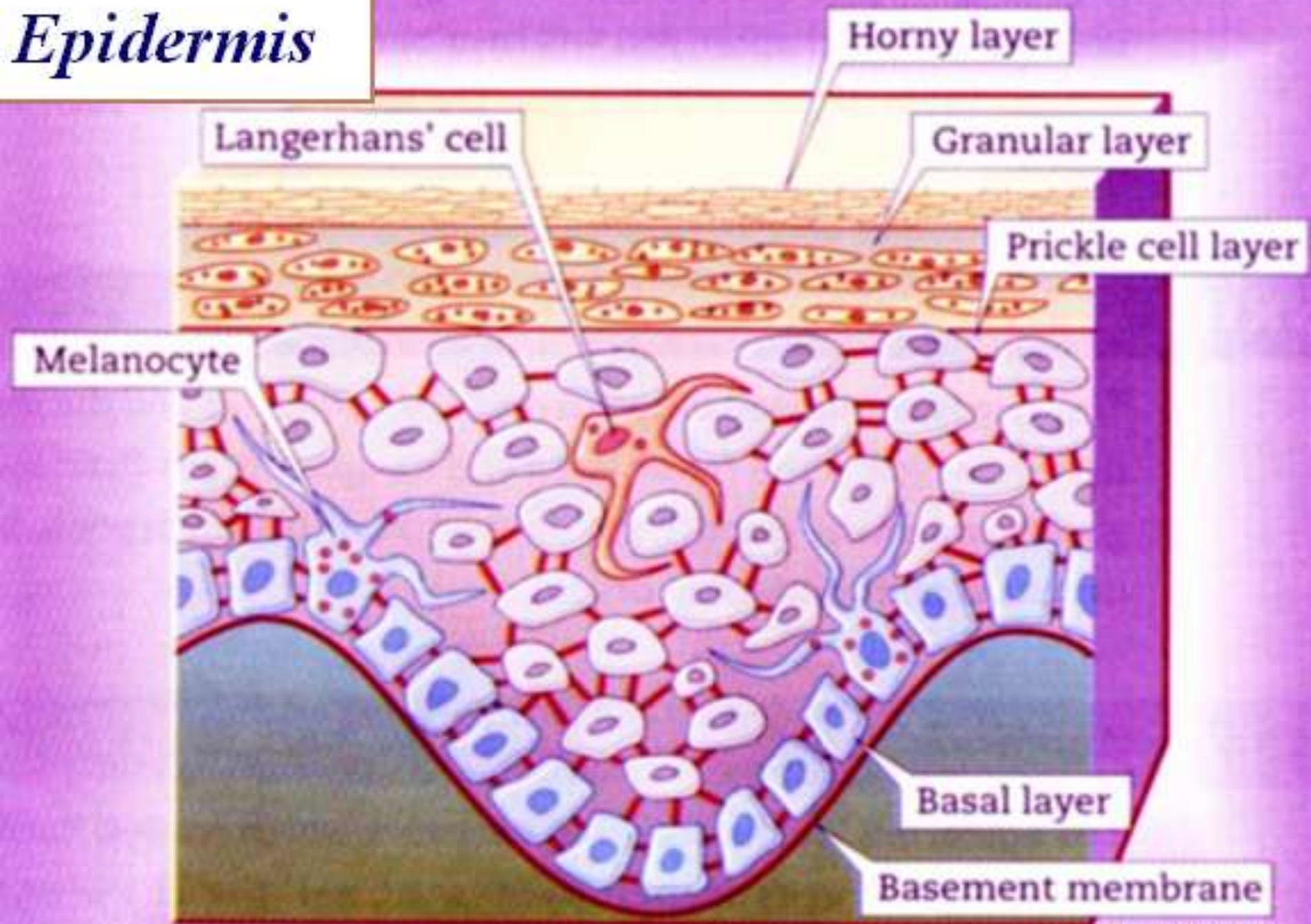
- **Epidermis** nonvascular outer layer of skin.
- **Dermis** : 40-folds thicker than epidermis.
 - It consists of connective tissue with blood vessels, nerve endings, hair follicles, sweat and sebaceous glands.

When dermis is destroyed all skin sensations are lost.

Structures of the Skin



Epidermis



Functions of the Skin

- **Identification**
- **Cosmetic Appearance**
- **Production of Vitamin D**
- **Sensations of touch, pain and temperature**
- **Maintenance of Body Temperature**
- **A protective Barrier**
 - **Protection from environment – UV radiation**
 - **Prevents evaporative water loss**
 - **Protection from microorganisms**

Functions of the Skin



- **Maintenance
of Body
Temperature**



Skin is the air-condition of the human body

Protective Barrier

Evaporative water loss

Microorganisms

Body fluid loss

**Skin is the shield of
human body**



Causes (Types) of Burns



Causes (Types) of Burn Injuries

- **Contact Heat burns**
- **Cold thermal injury**
- **Chemical burns**
- **Electrical burns**
- **Mechanical (*Frictional*) trauma**
- **Smoke & inhalation injury**
- **Radiation**

Contact Heat Burns

(most common)

Dry Heat:

- **Contact**
- **Flame**

Wet Heat:

- **Liquids** (Scald)
- **Gases** (Steam)



Daily life

Chemical

- **Strong acids or alkaloids**
 - **i.e. household cleaning products**
- **Management specific to chemical involved**

Electrical

- **Contact with an electrical current**
Open wiring or being struck by lightning
Pediatrics: chewing on electrical cord or placing object in outlet
- **Require some different management**

Cold Injuries

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

Radiation

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

Burn Statistics and Epidemiology (WHO 2004)

- Approximately 90 percent of burns occur in low to middle income countries
- The incidence of burns in low income countries is 1.3 per 100,000 population compared with an incidence of 0.14 per 100,000 population in high income countries (**Ten folds**)

Burn statistics in Egypt

- **0.1%** of population is affected by major burns.
- Burn is the **2nd** leading cause of accidental *death (after MVA)*.
- About *one third* need later reconstruction.
- The average *hospital stay* is **45 days**.

Burn statistics in Egypt

- Domestic causes account for 75% of burns.
- The *kitchen* is the most frequent area, the second area is the *bathroom*
- *Children* are the majority of admitted patients.
- *Complications* are greater after the age of 60.



Assessment of Burn injury

Assessment of Burn Injuries

Depth of Burn

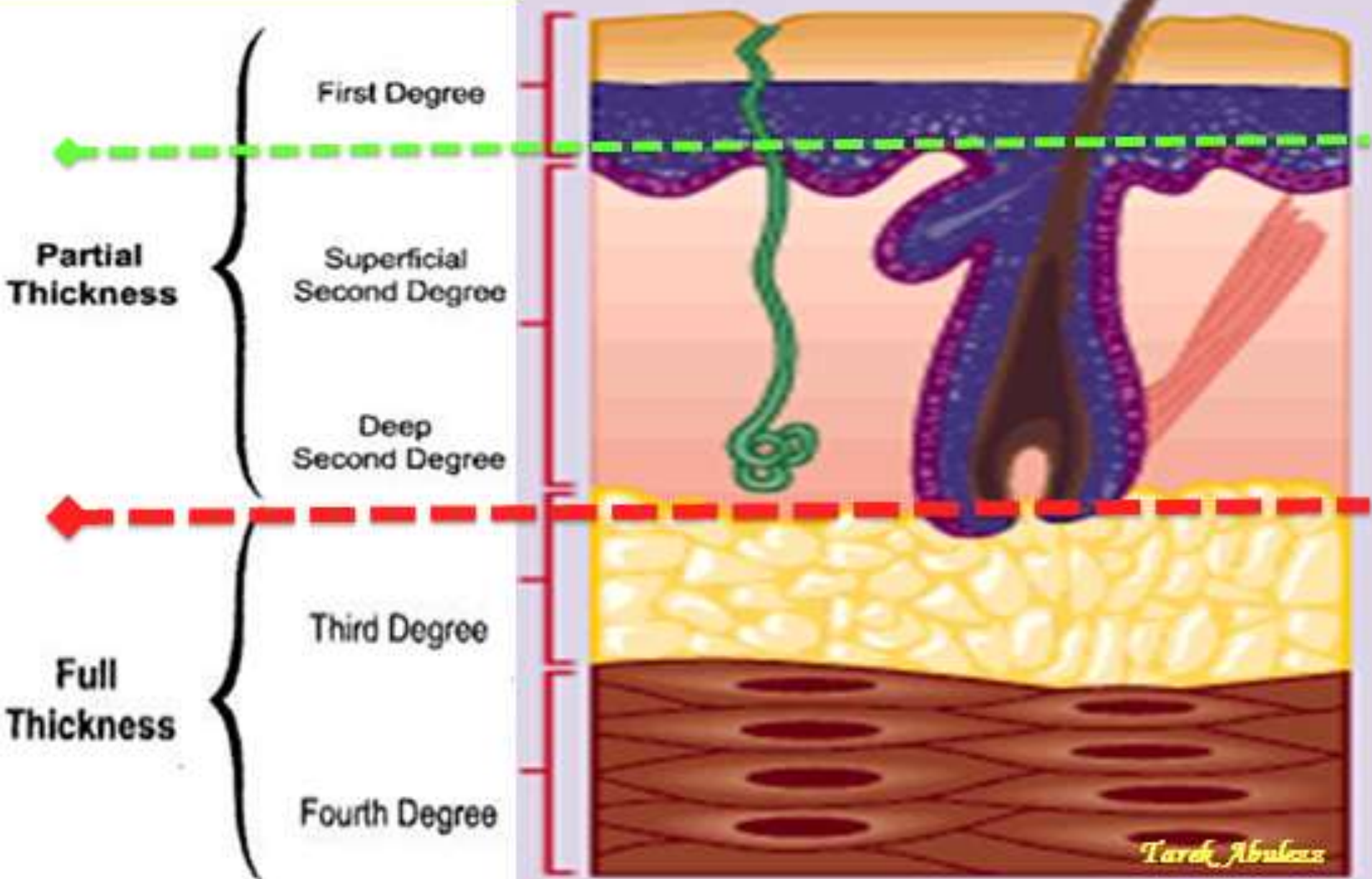
Extent of Burn

Cause of Burns

Classification of Burn Injuries

Depth of Burn

Burn Depth



Depth of Burn

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graph TD; A[Depth of Burn] --> B[Epidermal (Superficial)]; A --> C[Dermal (partial)]; A --> D[Full-Thickness]; C --> E[Superficial Dermal]; C --> F[Deep Dermal];
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The diagram is a hierarchical flowchart titled "Depth of Burn". The title is in a yellow box with blue text. It branches into three categories: "Epidermal (Superficial)" in a red box, "Dermal (partial)" in a red box, and "Full-Thickness" in a red box. The "Dermal (partial)" category further branches into "Superficial Dermal" and "Deep Dermal", which are in green boxes.

**Epidermal
(Superficial)**

**Dermal
(partial)**

**Full-
Thickness**

**Superficial
Dermal**

**Deep
Dermal**

Superficial (Epidermal) burns



Sunburn is a very superficial burn.
Blistering and peeling in a few days.
Heals in 3-7 days- generally no scarring
Topical creams provide relief.
Maintain hydration orally.
No need for antibiotics

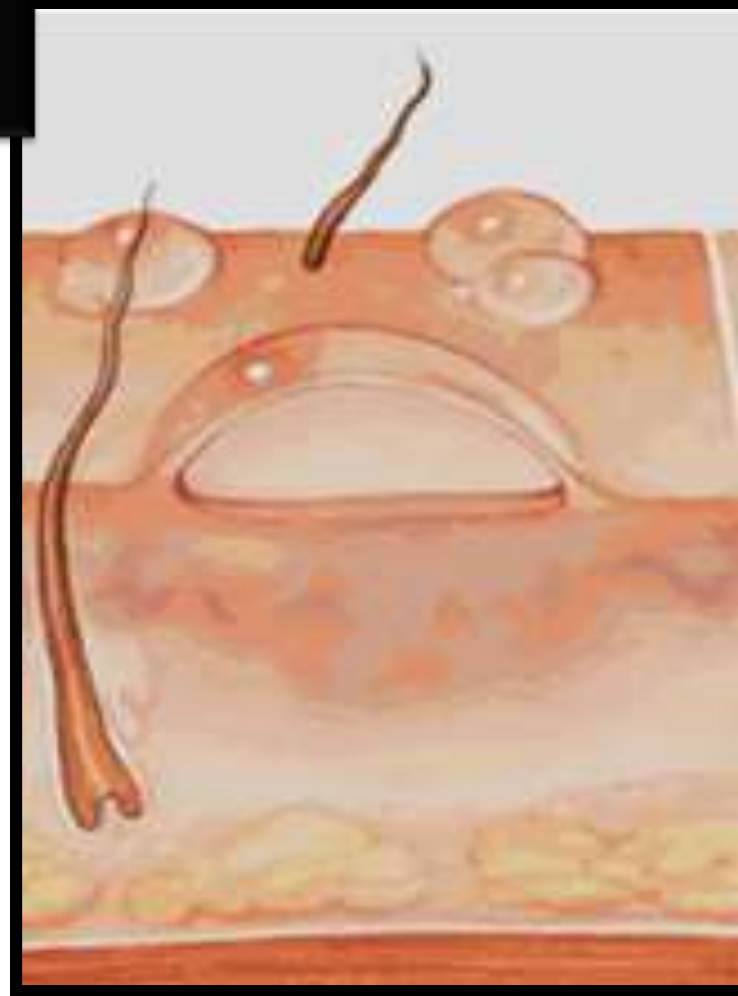
First degree burn is not calculated !!!

Dermal (2nd degree) Burns

- Two Types
 - Superficial (*2nd Degree*) dermal burn:
involving the superficial portion of dermis
 - Deep (*2nd Degree*) dermal burn:
involving the deep reticular dermis

Superficial Dermal Burns

- Involves upper 1/3 of dermis
- Wound characteristics:
 - Red to pink
 - Extremely painful
 - Wet and weeping wounds
 - Mild to moderate edema
 - Thin-walled, fluid-filled blisters



Superficial Dermal Burns

Wound Healing:

- In 2 weeks (spontaneous)
- Minimal scarring
- Minor pigment discoloration may occur



Deep Dermal Burns



- Blisters and bullae
- Blisters provide biologic dressing and comfort.
- Heals in 14-21 days
- Once blisters break, red raw surface will be very painful.

Deep Dermal Burns

- **Wound Appearance:**
 - **Mottled: Red, pink, or white area**
 - **Moist with Moderate edema**
 - **Thick-walled blisters (bullae)**
 - **Painful; usually less severe**
- **Spontaneous Healing ? ~ 2-6 weeks**
 - Hypertrophic scarring
 - Formation of contractures
- **Treatment of choice: surgical excision & skin grafting**



Full thickness burn

Involves the entire epidermis and dermis and may extend deeper to include muscle, tendons & possibly bone (electric burn).

- Wound Appearance:
 - Dry, leathery and rigid + Eschar (hard and inelastic)
 - Red, white, yellow, brown or black
 - Variable edema
 - Painless & insensitive to palpation
- No spontaneous healing
- Treatment: Surgical excision & skin grafting

Full thickness burn

- Initial management same as partial thickness.
- Dressing ... debridement and skin grafts.



- No sensation (nerve destroyed)
- Outer zone might be partial thickness.

- Full-thickness burns and deep partial thickness burns are initially *anesthetic* because nerve endings are destroyed.
- Superficial partial thickness burns are *painful* as the nerve endings are still intact.

Summary of burn classification by depth

Degree		CAUSE	APPEARANCE	PAIN	HEALING	SCAR
SUPERFICIAL (Epidermal)		Sunburn, Radiation	Red, painful, no blisters	Moderate -to - severe	7-10 days	No scarring
Partial (DERMAL)	SUPERFICIAL Dermal	hot liquid, flash flame	wet, pink, + blisters	severe	10-20 days	minimal
	DEEP Dermal	chemicals, direct contact flames	Wet-dry, pink-white ± thick blisters	minimal	2-6 weeks better grafted	moderate or severe
FULL- THICKNESS		chemicals, flames, Explosion, with very high temp.	dry, white Leathery, or char	none	need graft	Mild - severe depending on timing and type of graft

Pathophysiologic Changes

Zone Of Coagulation

Area of coagulation affected

Zone Of Stasis

Capillary occlusion, decreased perfusion Edema formation 24-48 hrs

Zone Of Hyperemia

Increased blood flow results from inflammatory processes

Pathophysiology

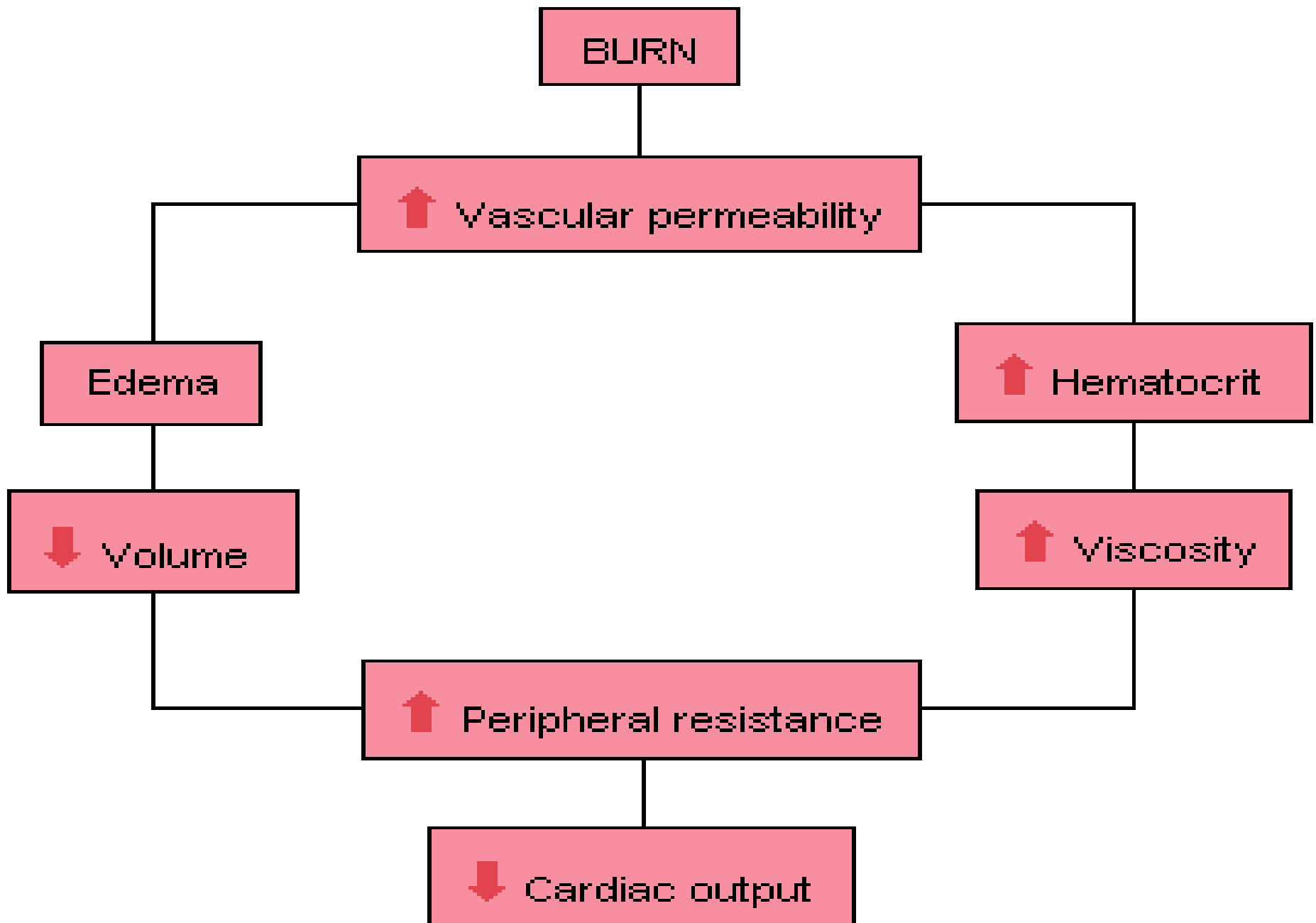
Loss of capillary tone

Release of vasoactive agents

**Moving of fluids and substances like proteins
from the intravascular to interstitial space**

Plasma loss and Intravascular volume loss

Diminished tissue perfusion



Hemodynamic changes

Hypovolemia

**Peripheral
vasoconstriction**

Hemoviscosity

**Burn
Shock**

Metabolic Changes

- Catecholamines are the major mediators of the hypermetabolic response to burn injury.
- "Burn fever" is common and it depends on burn depth and percentage.
- Fever spikes of 38.8°C – 39.4°C are common .
- Healing a large surface area requires much energy; glucose is the primary metabolic fuel.

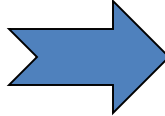
Metabolic Changes

- **Total body glucose store is limited (liver and muscle glycogen) and is exhausted within few days.**
- **Despite all nutritional support to burn victim, it is hard to counteract a negative nitrogen balance.**
- **ONLY Early closure of the burn wound makes a positive nitrogen balance.**

Immunologic change

- **The loss of the skin barrier and presence of eschar favor bacterial growth.**
- **Hypoxia, acidosis, and thrombosis of vessels in the wound area impair host resistance to pathogenic bacteria.**
- **Burn wound sepsis - the wound will be fully colonized in 3 to 5 days - Seeding of bacteria from the wound may give rise to systemic septicemia.**

Gastrointestinal changes

- Sympathetic response to burn   peristalsis and  gastric emptying time (**nausea, vomiting**).
- Ischemia of the gastric mucosa and other etiologic factors put the burn patient at risk for duodenal and gastric ***Curling's*** ulcer.

Classification of Burn Injuries

Extent of Burn

Classification of Burn Injuries

- **Extent of Burn Injury**
 - **Total Body Surface Area (TBSA) Burned**
 - **Palm Method**
 - **Rule of Nines**
 - **Lund-Browder Method**

First degree burn is not calculated !!!

Palm Method

- **A quick method to evaluate scattered or localized burns**
- **Patient's palm = 1 % TBSA**

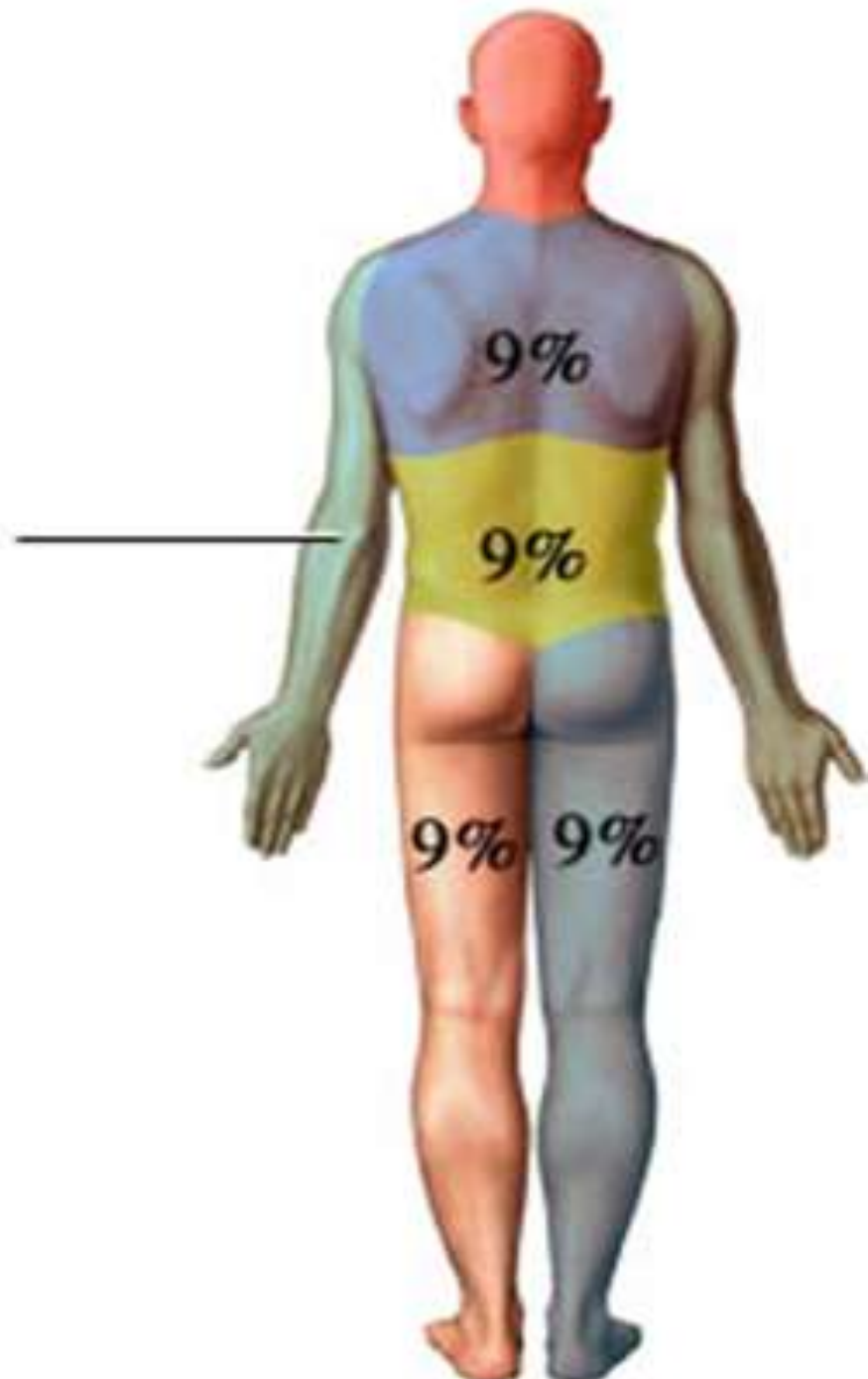
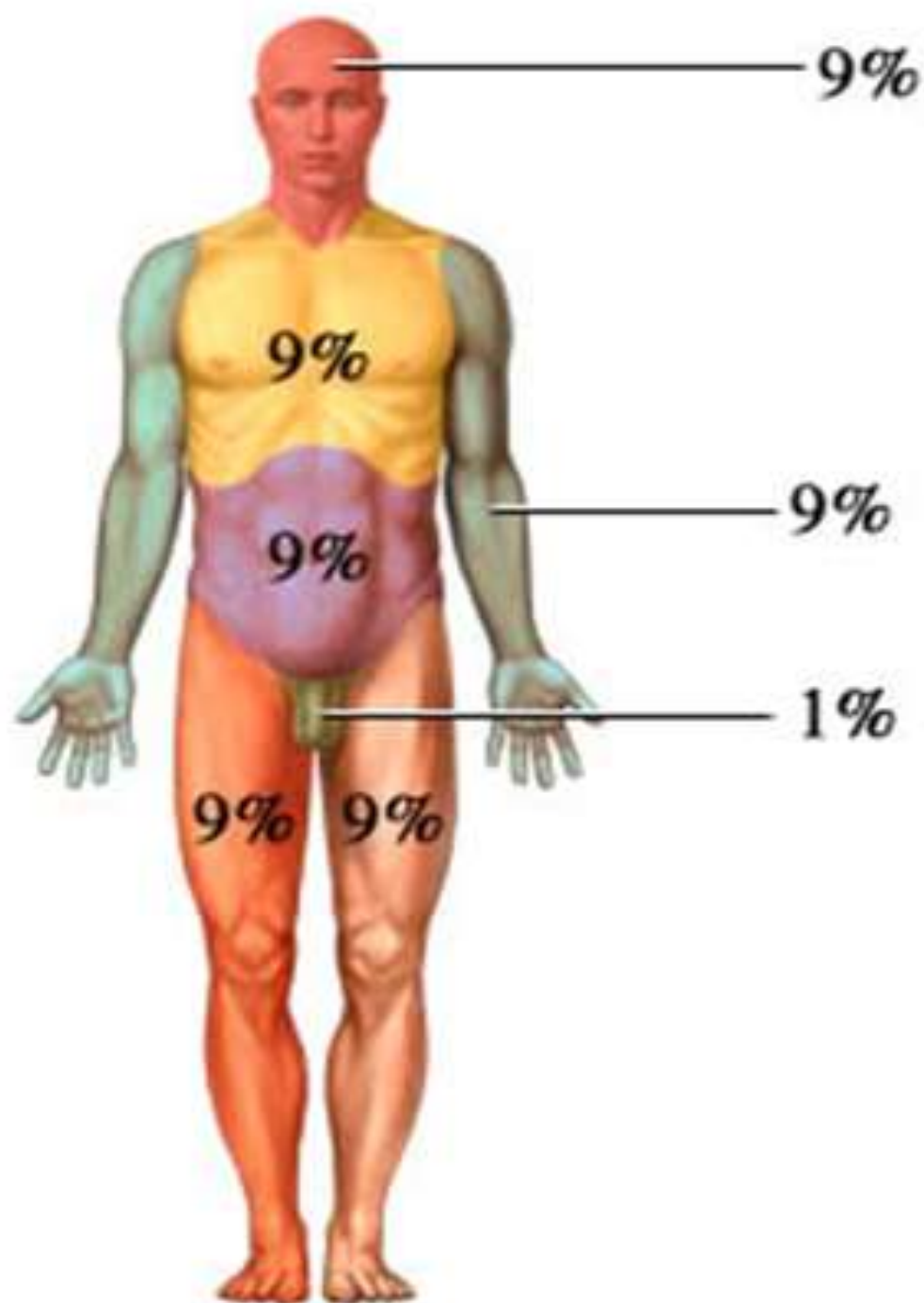


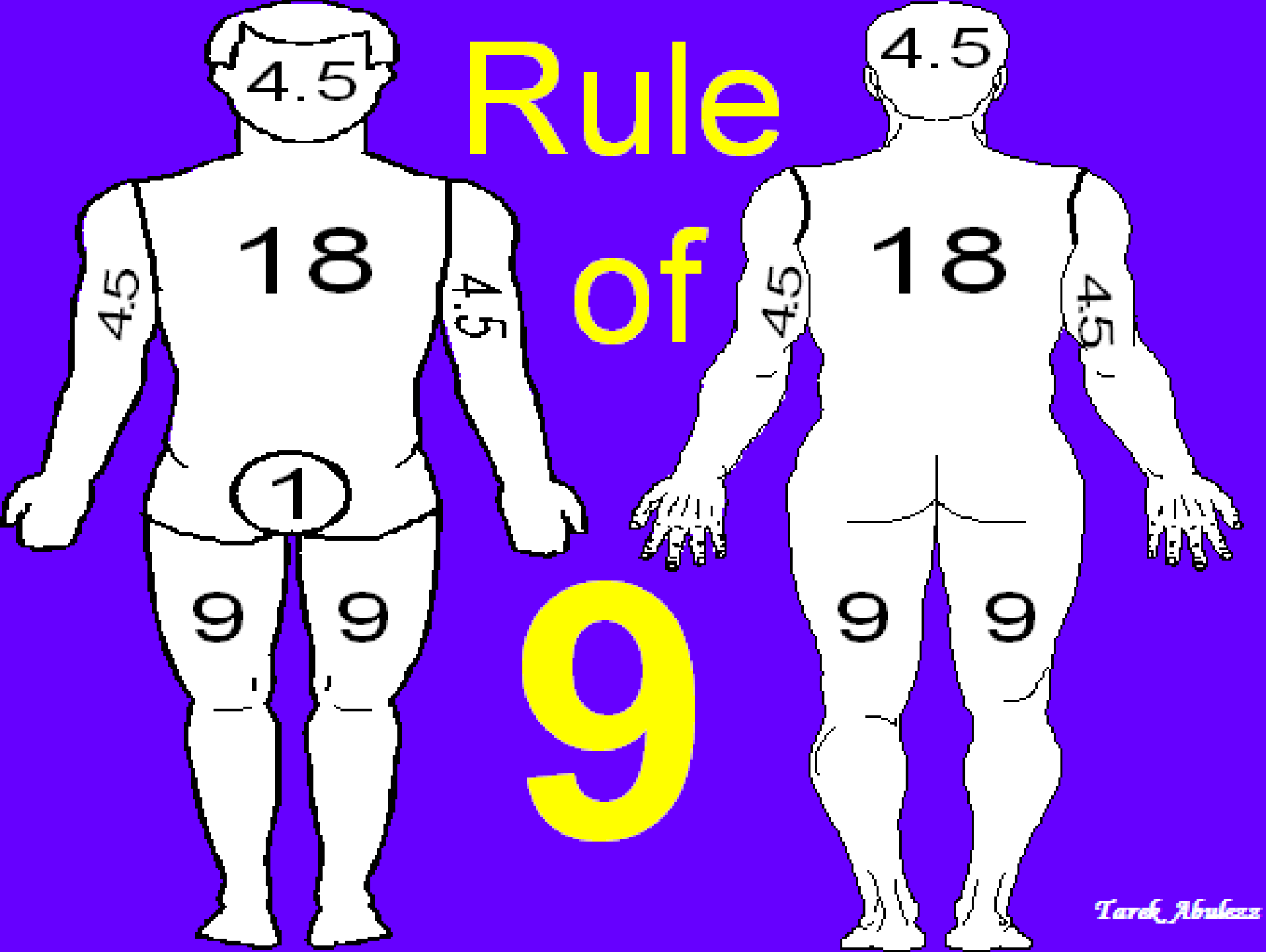
Rule of Nines

- **A quick method to evaluate the extent of burns**
- **Major body surface areas divided into multiples of nine.**

9

Modified version for children and infants
because a relatively more area is taken up by the head and less by the lower extremities.

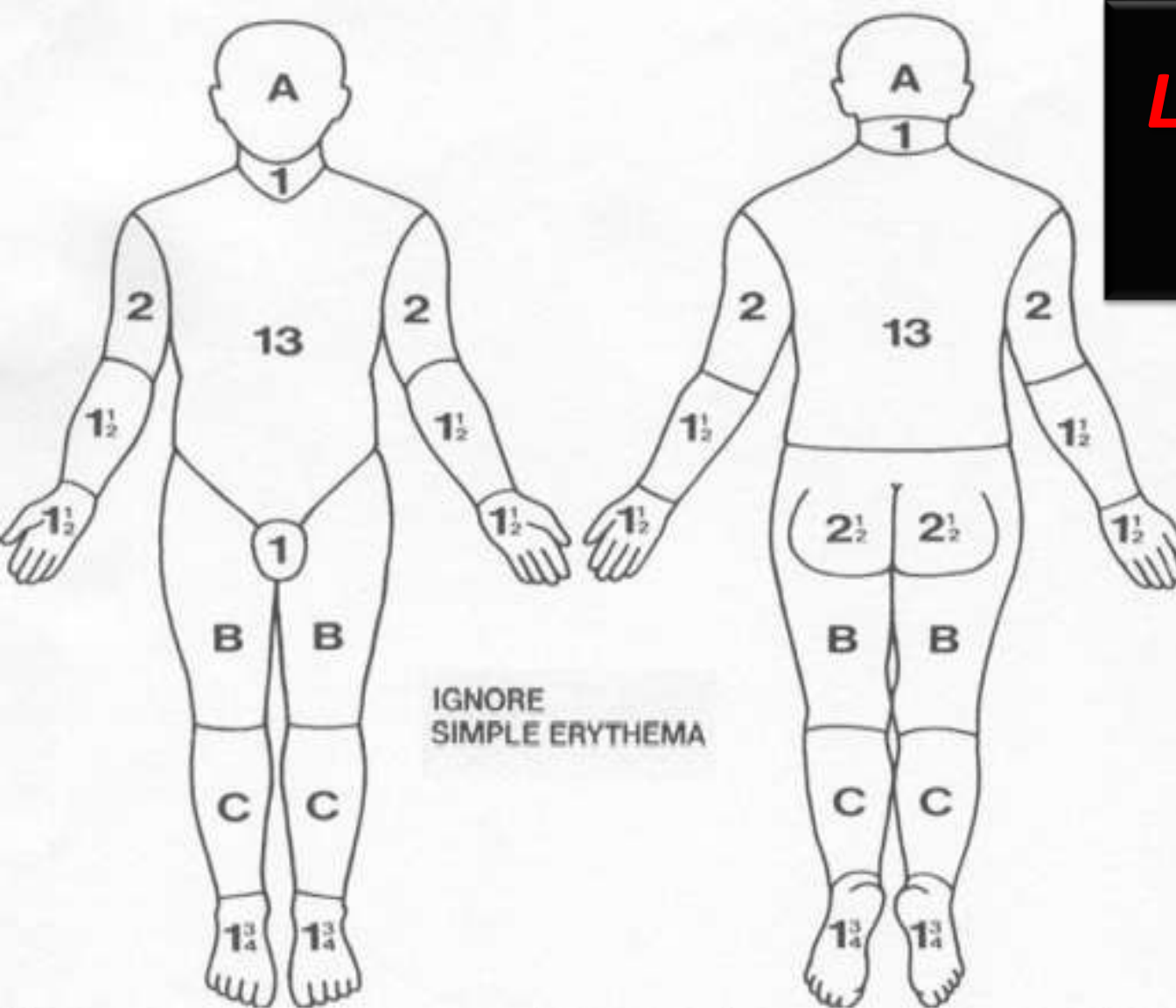




Lund-Browder Method

- **Can be used for adults, children & infants**
- **Most Accurate; based on age (growth)**

Lund-Browder Chart



REGION	%
HEAD	
NECK	
ANT. TRUNK	
POST. TRUNK	
RIGHT ARM	
LEFT ARM	
BUTTOCKS	
GENITALIA	
RIGHT LEG	
LEFT LEG	
TOTAL BURN	

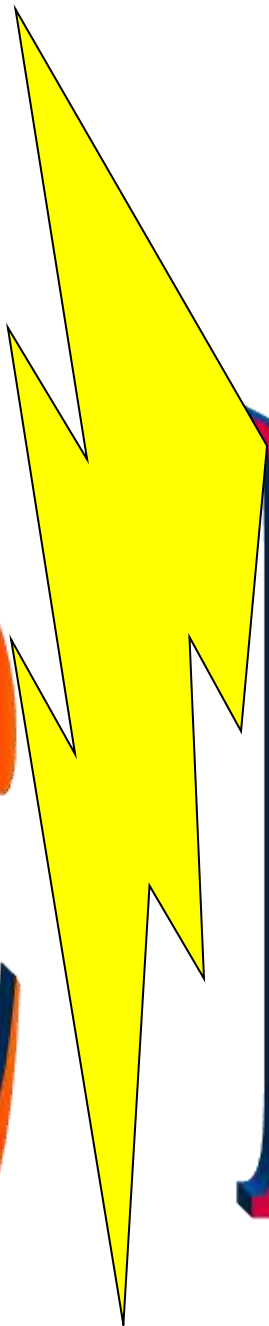
AREA	AGE 0	1	5	10	15	ADULT
A = ½ OF HEAD	9½	8½	6½	5½	4½	3½
B = ½ OF ONE THIGH	2¾	3¼	4	4½	4½	4¾
C = ½ OF ONE LEG	2½	2½	2¾	3	3¼	3½

Classification of Burn Injuries

Cause of Burn

Special Burn Injuries

Electric Burns

The word 'Electric' is rendered in a large, stylized, 3D font with a blue-to-red gradient. A bright yellow lightning bolt with a black outline strikes the letter 'i'. The word 'Burns' is also in a large, stylized, 3D font with a blue-to-red gradient, positioned to the right of 'Electric'.

Electrical Burn Severity

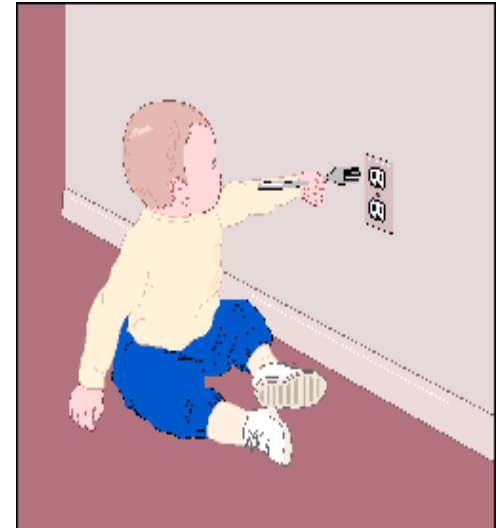
- The severity of an electrical injury is most closely correlated with the **amperage and voltage** of the current.
- A common phenomenon is an apparent progressive loss of viable tissue, occurring in the first few days after an electrical injury.
- The explanation for this phenomenon is a delayed thrombosis of microvasculature caused by the electrical current.

Electrical injury can cause:

- Severe metabolic acidosis.
- Cardiac arrest or arrhythmias.
- Fractures of long bones and spines
- Myoglobinuria with acute renal failure
- Long-term Eye complications...as cataract

Electrical Burn Severity

- In young children (1 to 2 years old), burn involves the lips, tongue, or oral mucosa and underlying bone.
- Sucking an extension cord is responsible for > 50% of the injuries, and biting on an electric cord accounts for 30%.
- The hands are burned in older children (playing in the electric plugs with a steel pins).



Electrical Burn in children

These burns often occur at the corners of the mouth caused by biting on an electrical cord.



Electrical Burn *Low-Tension injury*



Entry & exit wounds

High-Voltage electric burn

About 3% of
hospital
admissions for
burn injuries.



Special Burn Injuries

Chemical Burns

Chemical Burns

- With chemical burns, tissue destruction may continue for up to 72 hours afterwards.
- It is important to remove the person from the burning agent or vice versa.
- The latter is accomplished by copiously irrigating the affected area with copious amounts of water.

Chemical Burns

- Strong acids
 - i.e. household cleaning products- e.g. “Loloa”
 - sulfuric acid
 - Phenic (carbolic acid)
- Strong alkaloids
 - Lime, potassium hydroxide, and sodium hydroxide.
 - Cement (calcium oxide)
- Hydrocarbons
 - like gasoline, kerosene, or diesel fuel can produce a full-thickness injury.

Mechanism/Type: Chemical Burn



Mechanism/Type: Chemical Burn



Mechanism/Type: Chemical Burn



Special Burn Injuries

Inhalation Injury

Lung Burn (Inhalation Injuries)

- **Upper airway edema is the earliest consequence of inhalation injury.**
- **It may occur during the first 6 to 24 hours after injury.**
- **Early obstruction of the upper airway is managed with intubation.**

Inhalation Injuries

- **Airway**
 - Facial and scalp burns
 - Singed nasal hair, eyebrows
 - Sooty sputum
 - Soot, swelling, redness
 - Hoarse voice
 - Wheezing, persistent cough
- Repeated Assessments



Inhalation Injuries



Management of Burn Victim

What are the First Aid Measures?

When to Refer to a Burn Center?

How to manage the victim?

How to manage the burn wound?

How Can we prevent burn?



First Aid Measures for Burn victim

- **Stop the burning process**
- **Run cool water over burned area**
- **Remove all clothing off the burned area**
- **Cover with a clean dry cloth**

First Aid Measures for Burn victim

- Avoid shock by elevating the legs
- Keep the victim warm with a clean sheet or blanket
- Encourage the victim to drink fresh drinks

First-Aid Measures for a burn

- Remove all clothing, shoes, diapers, metal, *Rings* jewelry/body piercings
- Cool the burn *briefly with cold water* For **5** minutes.
- No ice ... No milk ... No Eggs ... No Tooth Pastes
- *No Antibiotic “Burn” Spray*
- *Remove wet clothing and items*
- Cover with clean, dry covering

يسكب الماء البارد على
الجزء المصاب



First Aid Measures for Burn victim



Tarek Abulezz

First Aid Measures for Burn victim

- **DO NOT** apply cold water to more than 20% of an adult's body surface (10% for children) and don't apply for > an 10 min ... > “**Hypothermia**”.
- **DO NOT** apply tooth-paste, grease, butter, spray, coffee, egg etc....
- **DO NOT** break blisters ... Intact blisters are excellent dressings. Cover a ruptured blister with antibiotic ointment and a dry clean dressing.

?? Antibiotic Spray ??

- The indiscriminate use of combined antibiotic spray should be discouraged ...its effectiveness should be balanced with its potential toxicity



First Aid Measures for Burn victim

Electrical burns

- Find source and turn it off
- Do not approach victim until you are sure power is turned off

Chemical burns

- Flush affected area with ?? cold ?? running water for at least 20 minutes
- If the area is still painful, continue to flush until pain stops.

First Aids for burn victim: Do's

- **Extinguish flames.**
- **Stop the burning process (remove clothing) .**
- **Use cool running water to cool the burn.**
- **In chemical burns, irrigate with water.**
- **Wrap the patient in a clean cloth or sheet and transport to the nearest appropriate facility for medical care.**

(WHO recommendations)

First Aids for burn victim: Don'ts

- **Do not start first aid before ensuring your own safety.**
- **Do not apply paste, oil, or raw cotton to the burn.**
- **Do not apply ice because it deepens the injury.**
- **Avoid prolonged cooling with water (hypothermia).**
- **Do not open blisters until the patient has been placed under appropriate medical care.**

(WHO recommendations)

وصايا المصاطب: الحروق

- ابعد ريحة الصابون عن الواد لحسن يشم.
- أوعى الواد يشرب مية
- روح الصيدلية هات بخاخة حرق
- ما تتشغلشى ما دام الحرق فى الجلد بس
- أحسن دكتور الدكتور ”عدنان“ بتاع الجلدية

• الصابون مطهر و مفيد لغسيل الجروح ومنها الحروق (الجروح مش بتشم).

• الحرق نوع من أنواع الجروح .. محتاج جراح

• لا داعى لمنع مصاب الحروق من شرب الماء بل شرب السوائل مطلوب و مفيد جدا.

• الحرق فى الجلد بس ... بس برضه خطير –
التكليف مش راح يشتغل و الشبابيك مفتوحة.

• أسوأ شئ ممكن تحطه على الحرق **البخاخة**

• المرهم مش مخلص الحرق ينشف ... طيب ينشف
ليه؟؟ Moist environment helps healing

Burn Referral Criteria

❖ *PARTIAL THICKNESS BURNS*

- *>10%* of TBSA in <10yrs old & >50yrs old.
- *>20%* of TBSA in other age groups.

❖ *FULL THICKNESS BURNS > 5% in any age group*

Burn Referral Criteria

ELECTRICAL BURNS

CHEMICAL BURNS

INHALATION BURNS

PRE-EXISTING MEDICAL ILLNESS (D.M., Hepatic)

CONCOMITANT TRAUMA (Fractures)

BURNS affecting Face, eyes, ears, hands, feet, genitalia, perineum or major joints.

Management of Burn Victim

A-B-C-D-E-F

A = Airway– patency

B = Breathing– check for signs of inhalation burn.

C = Circulation– presence and quality of pulses

D = Drug therapy and Dressing

E = Exposure and Examination

F = Fluid Resuscitation and Feeding

Drug Therapy- Opioid analgesics

- IV access (Multiple)
- Pain management
 - Once vital signs have been stabilized, pain medication should be used as indicated as they can combat shock.
 - Morphine or Fentanyl Drip.
- IV is used due to:
 - *GI function is slowed or impaired because of shock and/or paralytic ileus*
 - *I.M. injections will not be absorbed well (sluggish circulation)*

Drug Therapy - ***Beta Blockers***

- Patients with burns $> 40\%$ are always catabolic, and their metabolic derangement persists for at least a year after injury.
- Propranolol reduces hypermetabolism, heart rate, oxygen demand and resting energy expenditure.
- Beta-blockers reduce wound infection rate, and wound healing time and thus improving mortality.

Drug Therapy- Vitamin C and antioxidants

High dose vitamin C given I.V. in the first 24 hours after burn has been documented to ameliorate burn inflammatory process and promote healing.



Other antioxidants like Vit E, Zink and vit A are recommended

Drug Therapy- gastric protector- anti-tetanus

- Curlings ulcer prophylaxis (Peptic Ulcer)

An **H2 blocker** or Proton Pump inhibitors

- ??? Tetanus ??

Tetanus immunization may be given because of the likelihood of anaerobic burn-wound contamination

Drug Therapy- antimicrobials

- Antimicrobial agents
- When systemic antibiotics should be used?
 - Fever, septicemia,
 - Prophylactic ??
 - what spectrum (*against gram+ve in the first 3 days.....then anti-Pseudomoneal*)
- Topical Versus Systemic.
 - Silver sulfadiazine, Bovidine Iodine.. Honey*

Topical Antibacterial Agents



Fluid Resuscitation

Goal: To maintain vital organ function while avoiding the complications of inadequate or excessive therapy

Fluid Resuscitation

- Proper fluid management is critical to the survival of patients with extensive burns.
- Proper fluid management aims to maintain good tissue perfusion .



Fluid Therapy - Objectives

HR < 100/minute

Urine output - 0.5-1 cc/kg/hr

Normal sensorium (alert, oriented)

Resuscitation formula's are only an estimate, adjust to individual patient responses

Monitor for Pulmonary Edema



BURN FLUID REPLACEMENT FORMULAS

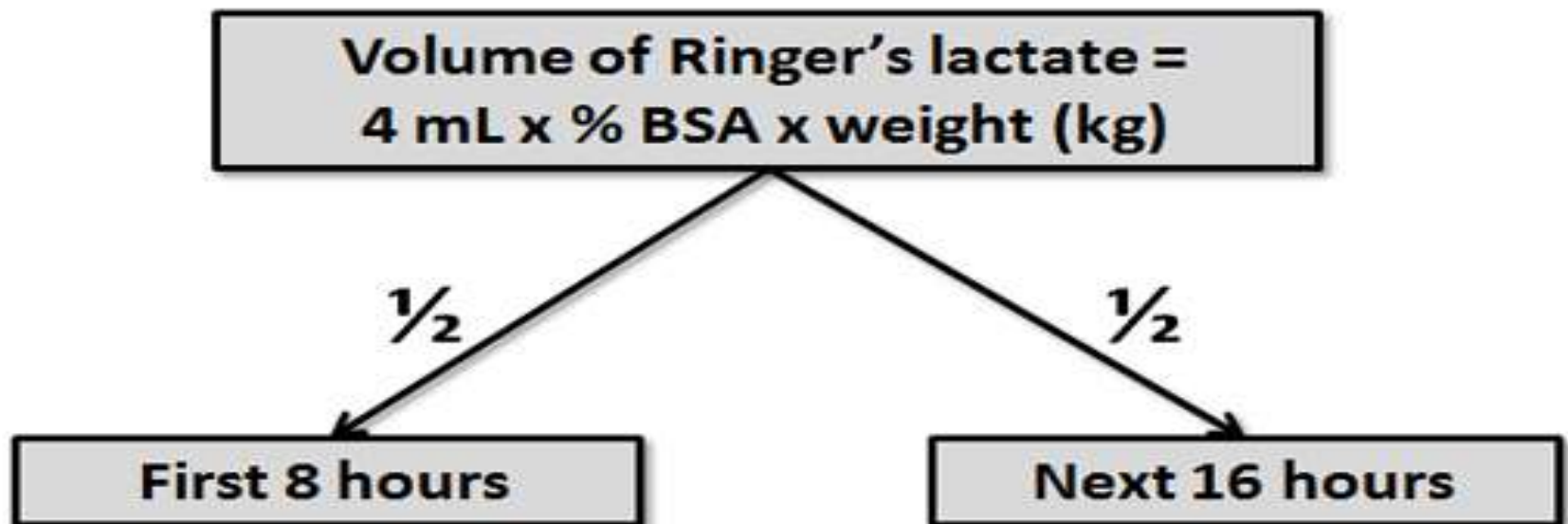
FORMULA	ELECTROLYTE SOLUTION	COLLOID	WATER	RATE	EXAMPLE: 70 KG/45% TBSA (PER 24 HR)
Evans	1 ml/kg/% TBSA NS	1 ml/kg/%	2000 ml	½, 1st 8 hr; ½, next 16 hr	3150 ml NS
					3150 ml colloid
					2000 ml water
					8300 ml TOTAL
Brooke	1.5 ml/kg/% TBSA LR	0.5 ml/kg/%	2000 ml	½, 1st 8 hr; ½, next 16 hr	4725 ml LR
					1575 ml colloid
					2000 ml water
					8300 ml TOTAL
Modified Brooke	2–3 ml/kg/% TBSA LR	None	None	½, 1st 8 hr; ½, next 16 hr	6300–9450 ml LR
Parkland (Baxter)	4 ml/kg/% TBSA LR	None	None	½, 1st 8 hr; ½, next 16 hr	12,600 ml LR
Hypertonic formula	Rate based on urine output of 30 ml/hr with hypertonic LR (sodium, 250 mEq/L)	None	None	To maintain urine output	Unknown

Resuscitation Fluid Needs: First 24 Hours

- **Parkland Formula:**
 - **2-4 ml RL X Kg body weight X % burn**
 - First $\frac{1}{2}$ of total volume is given in the first 8 hours
 - Remaining $\frac{1}{2}$ of is given over following 16 hours
- **Crystalloid fluid is keystone, colloid not useful**

Resuscitation Fluid Needs: First 24 Hours

Parkland Formula



- Crystalloid fluid is keystone, colloid not useful

Resuscitation Fluid Needs: 2nd 24 Hours

- ❖ Capillary permeability gradually returns to normal
- ❖ Colloid fluids started to minimize volume
- ❖ Only necessary in patients with large burns (greater than 30% TBSA)
- ❖ 0.5 ml of 5% albumin **X** Kg body weight **X** % burn

Assessment of Fluid Resuscitation

- Blood pressure: > 100 mmHg

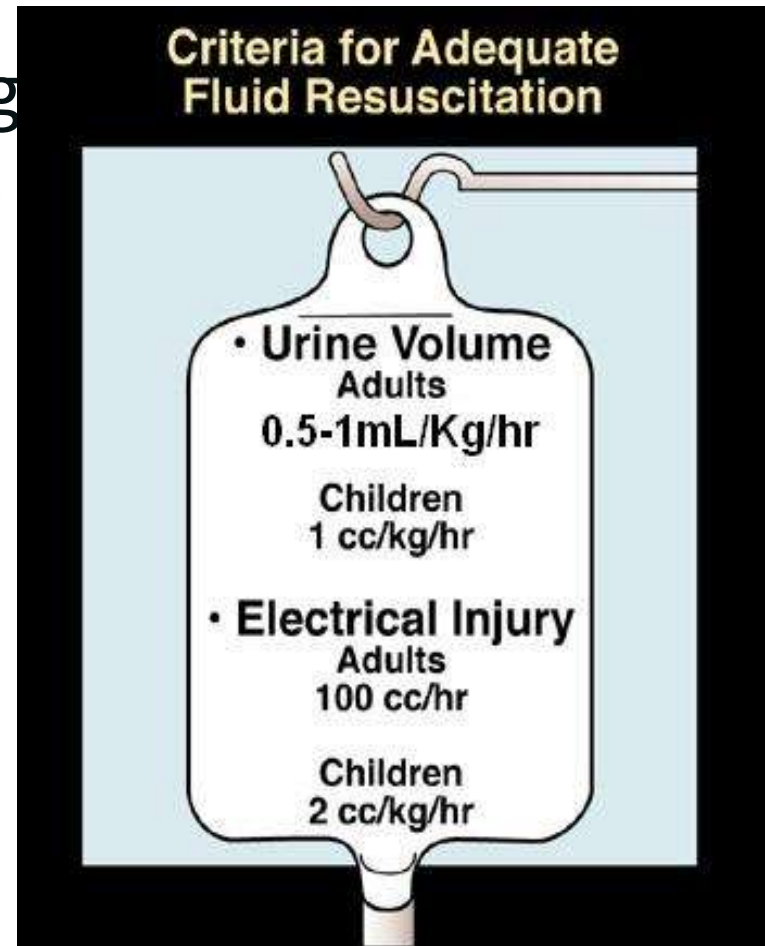
Can be misleading due to edema & vasoconstriction

- Heart Rate: < 100 B/M

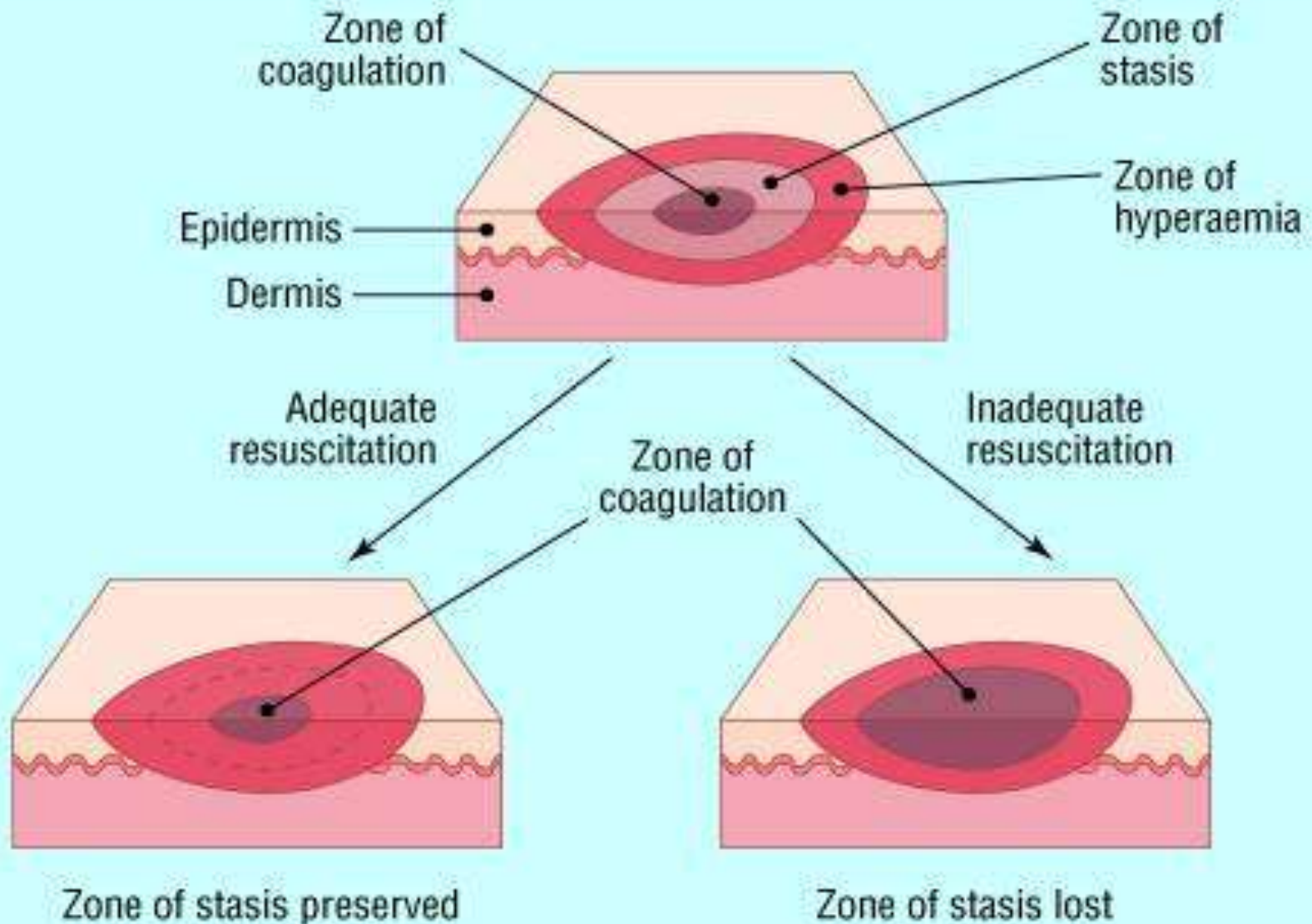
Tachycardia commonly observed

- Urine output: $0.5-1$ ml/Kg/Hour

The most reliable guide



Effects of adequate and inadequate resuscitation



Feeding and Nutritional Support

- Burn victims need more calories than normal subject support and enhance wound healing.
- Adequate protein intake is required. the protein requirement is increased to 1.5–2.5 g/kg per day in treatment of severely-burned patients.
- Vitamins should be supplied in adequate amount.

Selection for Outpatient Care

- Airways must not be compromised.
- Small wound - fluid resuscitation is unnecessary
- The patient can take adequate fluid orally.
- Serious burns to the face, hands, or genitals should initially be managed in an hospital.
- The patient and family must be able to support an outpatient care plan.

Feeding and Nutritional Support

Enteral Feeding:

- prevents toxic infective complications, particularly those originating in the shock phase in the first hours and...
- gives patients a higher level of comfort, thanks also to the palatability of the diet.



Feeding and Nutritional Support

- Enteral feeding is the first choice.
- Nutrition should be started within the first 48 h on admission.



■ **Only when enteral feeding is impossible, parenteral nutrition is utilized.**

Feeding and Nutritional Support

Enteral Feeding

Enteral nutrition has :

- reduced the mortality rate,
- improved the immune state
- Enhanced wound healing and shortened the hospitalization.



Burns Wound Management

General Principles of Wound Care

- **Control cross-contamination.**
- **Adequate stress management.**
- **Avoid hypothermia.**
- **Wound dressing**

Sepsis and Antimicrobials

Burn injury is associated with a loss of immune-competence, and sepsis remains a major cause of death in burns.

Early sepsis (1-3 days post burn) is usually streptococcal or staphylococcal.

Late sepsis is usually due to Pseudomonas, acinetobacter and fungi.

General Principles of Wound Care

Avoid Cross-Contamination

- Wear caps, masks, gown, gloves wash hands before and after dressing.
- Expose, clean, and rewrap less infected areas first.
- Look for sources of bacteria in equipment used...like invasive catheters.

General Principles of Wound Care

Stress Management

- Narcotic analgesic and short-acting sedative should be initiated before burn dressing.
- Use intravenous route.
- Antipyretics given before burn care attenuate the fever seen after wound manipulation.

General Principles of Wound Care

Avoid hypothermia

- Overhead heaters,
- Warm water,
- Sequential management of the wounds, rather than total patient exposure.

General Principles of Wound Care

Wound Dressing

- Warm saline may be used to soak adherent dressings to avoid excessive discomfort or bleeding.
- Use separate bowl of saline for clean and contaminated areas.
- Change gloves after washing contaminated areas, especially buttocks and genital area.

Burn Wound Dressing

Burn Wound Dressing

- *Open Method* - patient's burn is covered with a topical antibiotic and has no dressing.
- *Closed Method* – burned area is wrapped in a sterile gauze impregnated with topical antimicrobial. Dressings changed according to wound soaking from once/12 hours to once / 2 days.

Burn Wound Care – Closed method

- ❖ **Most wounds covered with several layers of sterile gauze dressings.**
- ❖ **Special Considerations:**
 - Joint area lightly wrapped to allow mobility
 - Circumferential burns: wrap distal to proximal
 - All fingers and toes should be wrapped separately
 - Splints always applied over dressings to maintain limbs in functional positions

Burn Wound Care – Closed method

- Daily inspection of the wound
- If gauze is adherent and dry (no exudates), simply change outer dry gauze.
- If soaked with exudates, the dressing should be removed, the wound gently washed with Saline and the dressing re-applied.

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



?? Bullae ??

Controversial
!!!!



Eschar

Management

What is Eschar??

a slough produced by a thermal burn, by a corrosive application, or by gangrene (<http://medical-dictionary.thefreedictionary.com>)



Eschar Formation

- **Skin denaturing**
 - **hard and leathery**
- **Skin constricts over wound**
 - **increased pressure underneath**
 - **restricts blood flow (when circumferential)**
- **Respiratory compromise**
 - **secondary to circumferential eschar around the chest**
- **Circulatory compromise**
 - **secondary to circumferential eschar around extremity**

ESCHAROTOMY – Upper limb



ESCHAROTOMY- Lower limb





Burn Dressing





Height adjustable bathtub



Burn cleansing in the shower trolley



Paraffin Gauze

Paraffin Gauze Dressing is made from open weave leno gauze.... It is ***Non-Adherent*** to the wound

Paraffin from an occlusive film over the skin, preventing evaporation, thus restoring elasticity of cracked and dry skin.

Paraffin Gauze Dressing can be combined with topical antiseptic and/or antibiotics.

Paraffin Gauze



رباط شاش

+

فازلين طبي أو
زيت بارافين

+

مرهم مضاد
للبكتريا

Burn Dressing



Burn Dressing



Wound Dressing

Absorb discharge

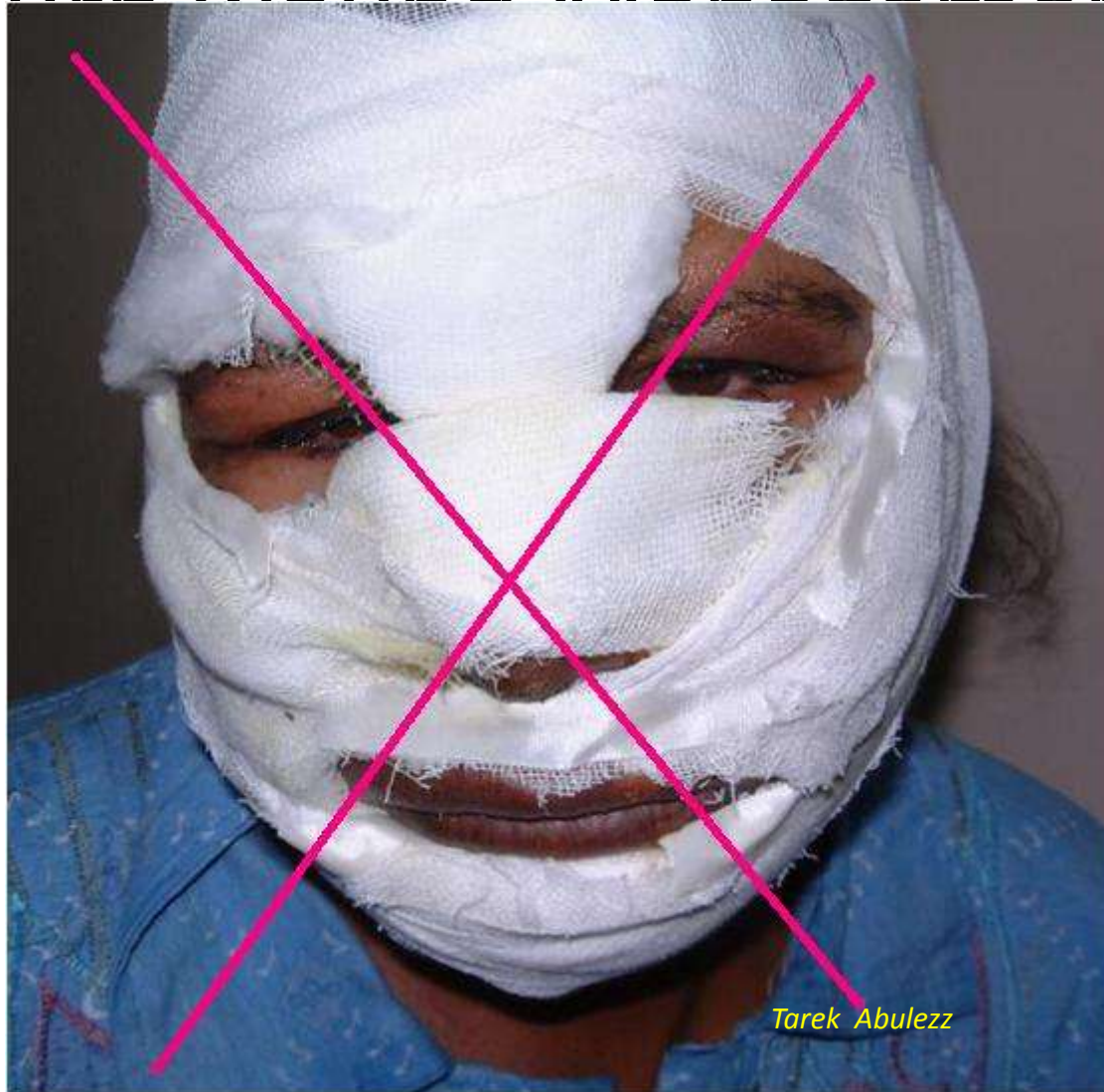
Alleviate pain

Reduce Infection

Burn Wound Care - open treatment

- **Areas such as the face and ears are then treated open, with an ointment to maintain wound moisture.**
- **Topical antimicrobial creams may be used to control gram-positive bacteria.**
- **Re-apply ointment two to three times daily.**
- **Gently wash off crusts, exudates, especially on face and neck with normal saline.**

Burn wound Management



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Burns

Mortality

& Morbidity

Burn Mortality (~ 5%)

Burn Morbidity & Mortality: Depend on:

- **Age of patients (Extremes of age < 6 ... > 60)**
- **Percentage of burn (> 40% TBSA)**
- **Inhalation Injury**
- **Associated medical diseases DM**

Infection is the most serious threat to further tissue injury and possible sepsis.

SURVIVAL is related to prevention of wound contamination.

- **Source of infection is patient's own flora, mainly from the skin, resp. tract, and GI tract.**
- **Prevention of cross contamination from other patients is the priority !**

Complicated Burn Wound Healing

Complicated Burn Wound Healing

- **Hypertrophic Scarring and Keloids**
- **Disfigurements and Contractures**
- **Leukoderma**
- **Malignant Transformation**

Hypertrophic



Hypertrophic Scar Characteristics

- **Surface erythema.**
- **Raised from wound surface.**
- **Lack of elasticity.**
- **Painful and itchy.**



Hypertrophic Scar



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Contractures



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Contractures

Leukoderma



Contractures - Leukoderma- Hypertrophic scars



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Malignant transformation

Marjolin's Ulcer



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Topical Antibacterial Agents



Drug therapy in brief

- *Early Enteral feeding* is highly recommended
- *IV route* is preferred for appropriate drugs.
- *Opioids - Analgesics* to alleviate anxiety
- *Vit C* along with *resuscitation fluids*
- *H-2 Blockers*
- *? B-Blockers*
- *Antibiotics – what , when?*

Burns Wound Management

Superficial Partial-Thickness Burn

Dressings/ Exposure (for about 2 weeks)

Deep Dermal Burn

2 weeks dressings. If no better graft.

OR early excision and grafting (when stable)

Full-Thickness burn

Debride and graft (when stable)

Don't Forget !

- IV analgesia before dressing.
- Wash hands thoroughly.
- Ensure warm environment
- Follow aseptic technique in dressing.
- No Antibiotic “Burn” Spray !!
- Oral feeding is encouraged.

Burns

Prevention

Kitchen Floor Safety

- **Choose floor surface with safety in mind**
- **Use nonslip mats near food preparation areas**
- **Wipe up spills immediately**
- **Be sure path is clear when carrying or serving food (children, toys, etc.)**

Child Burn Prevention Tips

- Keep hot foods away from table edges
- Turn stovetop pan handles inward
- Do not carry hot liquids while holding child
- Never leave children unattended in bathtub
- Position child's face away from faucet

“Stand By Your Pan!”

- Stay in the kitchen to fry, grill, broil or boil
- In case of a grease fire smother with matching pan lid, not by using a fire extinguisher
- In case of an oven fire, turn off oven, close door and wait until oven has cooled down

Electrical Wiring Safety



- Never overload outlets or extension cords
- Have electrician inspect and rewire or replace:
 - Loose appliance plugs
 - Frayed or cracked cords
 - Warm wall switches
 - Overloaded circuits cracked cords

شعراً لكم

For any question or recommendation:
tabulezz@sohag.edu.eg