

# **The Burn Patient**

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Called 'WIDOW-MAKERS'  
BECAUSE OF A HIGH ACCIDENT  
RATE, ONE AAF CREWMAN  
PUT AN ERSATZ DIAL ON  
THE PANEL THAT SAID  
IT ALL -



# Objectives

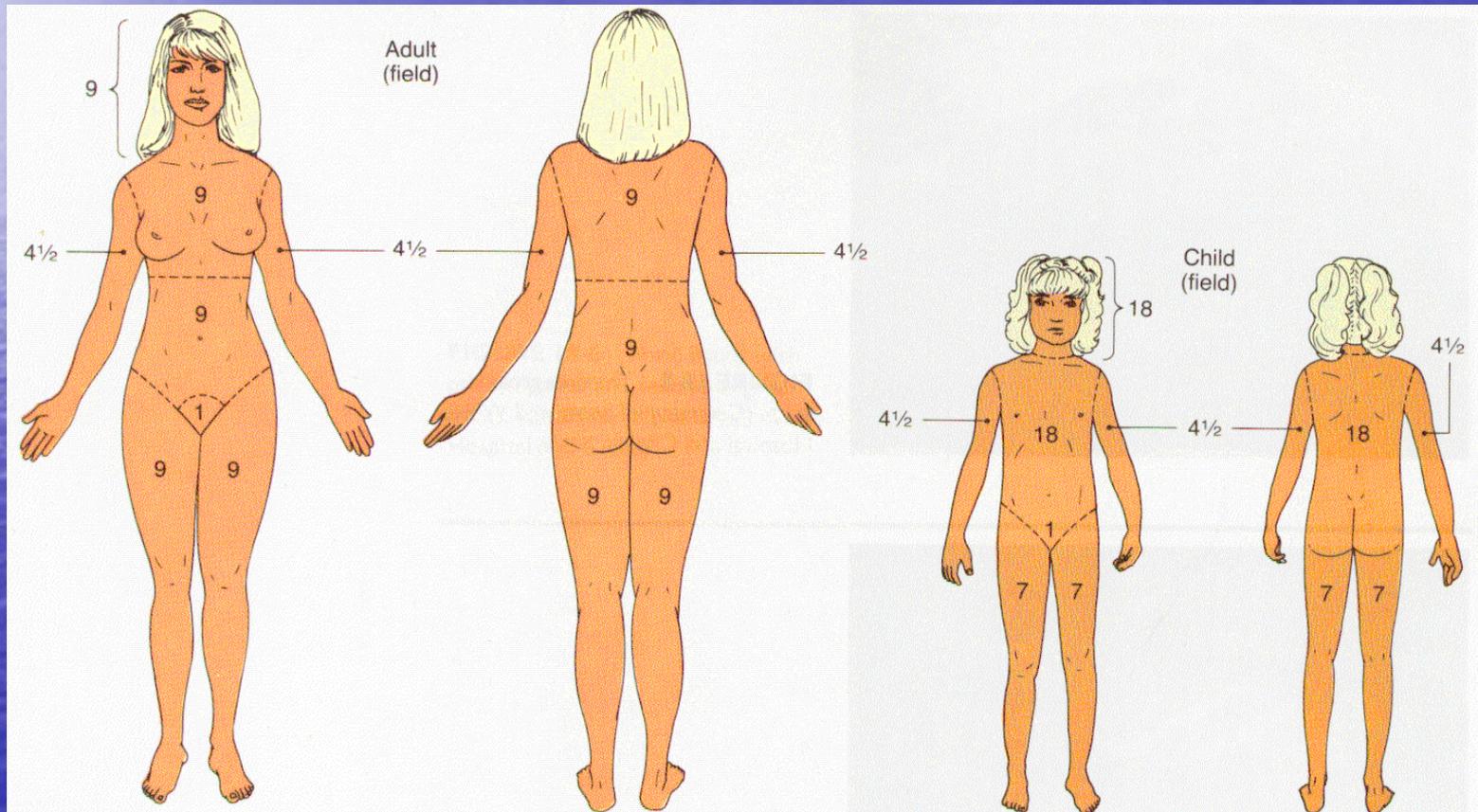
- **Describe the types of burns**
  - **Population at risk**
- **ABA guidelines for transport to burn center**
  - **Signs of inhalation**
  - **Assessment of surface involved**
    - **Burn formulas**
  - **Evaluation and management**

# Epidemiology

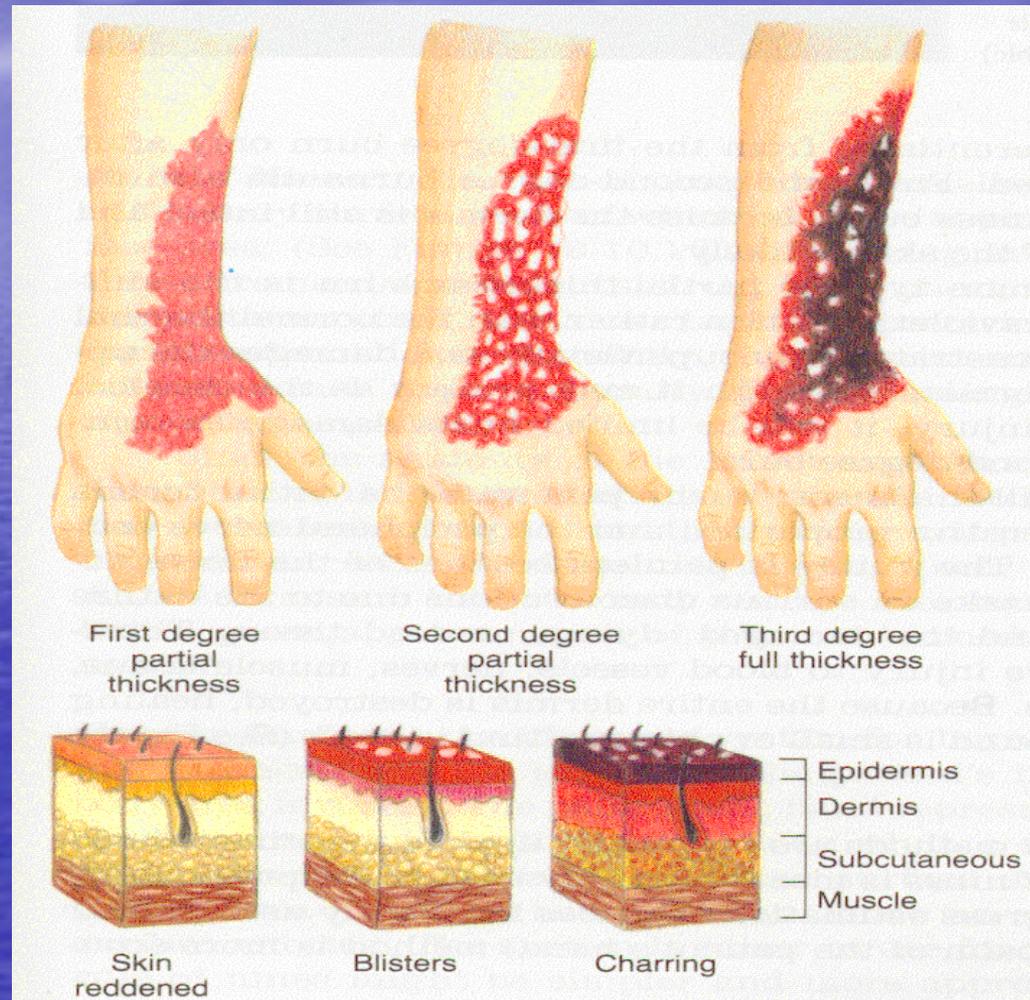
- 2 million burns per year
- 30 , 000 admissions a year
  - all age groups at risk
- Mortality increases with age
  - Males predominate
- Inhalation , Thermal , Chemical , Electrical
- Scenes are not always safe for providers

# Estimates of Involved Surface

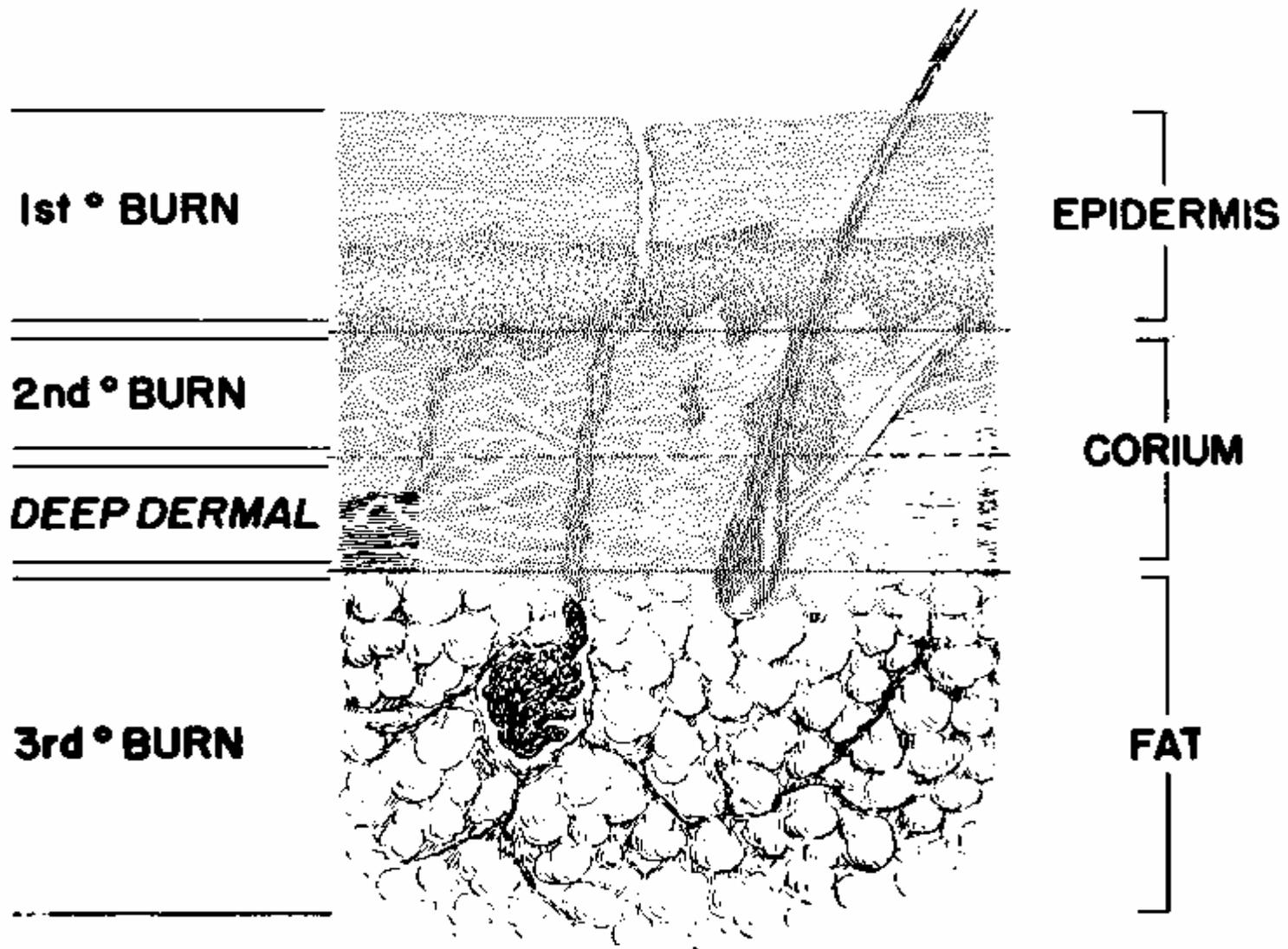
- Rule of Nines . . . . .



# Degree of Burn



# DIAGRAM OF SKIN: DEPTH OF BURN



# First Degree



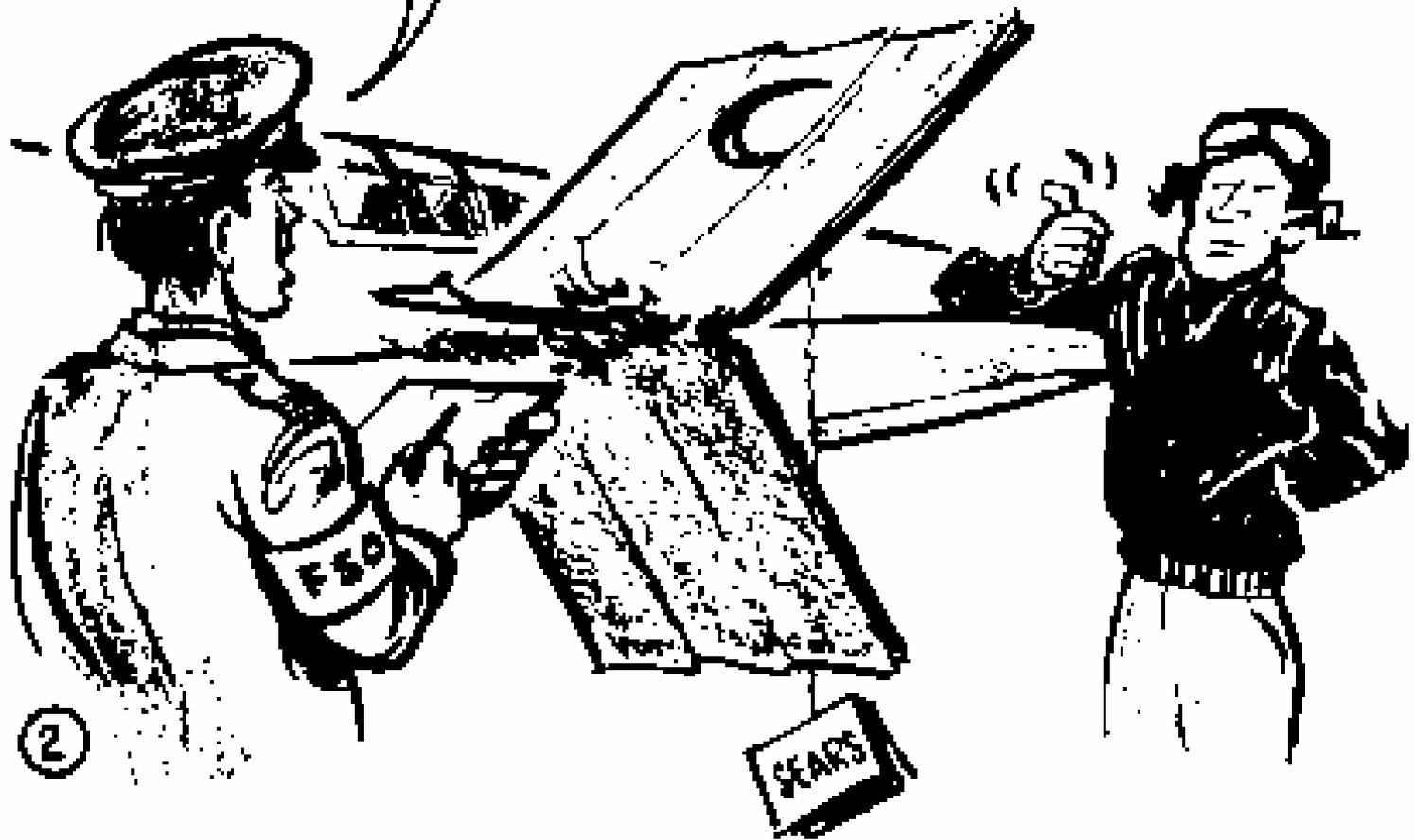
# Second Degree



# Third Degree



NOW, TELL ME AGAIN - WHAT WAS  
THE FIRST THING YOU SAW ? ...



# Facial Burns

- **Surface**
  - **Ocular**
  - **Airway**
- **Singed Nasal Hairs**
  - **Airway edema**
  - **Glossal Swelling**
  - **Epiglottic edema**
    - **Glottic edema**
- **Rapidly progressive deterioration**



# Ocular Burns

- Often chemical
- Contact lenses need to be removed
  - Copious irrigation
  - Sterile dressings
- Notify ED ASAP to arrange Ophthalmology Evaluation

# Pulmonary Burns

- Closed space
- Facial involvement
- Carbonaceous sputum
- Singed nasal hairs
  - Lip edema
    - Thermal
    - Chemical
  - Foreign debris
- Rapidly progressive deterioration

# Pulmonary Burns

- ABC's
- Definitive control of the airway
  - Humidified Oxygen
  - Prevent Hypoxia
  - Assist Ventilation
  - NG / Oral Gastric tubes
- Do Not Delay Transport to a Burn Center for Diagnostic Tests

# Circumferencial Burns

- Fluid replacement causes edema
- Capillary leaks / tighten the extremity
- Compartment pressures can go above arteriolar
- Monitor . . . . .
  - Pulses
  - Doppler flow
  - Tightness / Compartment pressures



# Electrical Burns

- CNS injury
- Peripheral nerve injury
- Cardiac arrhythmias
- Occult injury
- Low / high resistance tissues
- Low / high voltage < 1000 volts >
- Muscle injury / Myoglobinemia
- Renal injury / direct electrical / myoglobin
  - Entry and Exit wounds
  - AC / DC

# Electrical Burns

- **Arrhythmia when they occur usually at time of injury , not delayed**
- **Bone and skin are high resistance , occult injury very common**
- **Look for entry and exit wounds , all tissue between is at extreme surgical risk**
- **Myoglobinemia from muscle injury can shut down kidneys**
- **AC is more dangerous than DC**
- **Duration of shock determines extent of injury**



**Burns can be by direct contact or by arcing**

# Chemical Burns

- **Treatment Specific . . . . .**
  - **Hydrofluoric : Irrigate , Calcium Gluconate**
    - **HCL / Sulfuric : Bicarbonate irrigation**
    - **Phenol : No irrigation**
  - **White Phosphorous : Ignites with irrigation**
    - **Sample or container to hospital !!!**
    - **Treatment Kits at Industrial Sites !!!**



## **The Whatthehelloldo Now Dept.:**



**SITUATION: THREE HOURS OUT ON  
A SIX HOUR MISSION. YOU'VE CON-  
SUMED A CANTEEN OF WATER AND  
HAVE JUST STRUGGLED 10 MINUTES  
TO GET THE RELIEF TUBE ... AT LAST!**

# Fluid Resuscitation

- **Rapid volume depletion**
- **Diffuse capillary leaks**
- **> 15 % , Edema even where there is no burn**
- **Aggressive fluids are not needed for short trip**
- **Do not waste scene time for IV if under 15 minutes to the burn center**
- **Fluids critical for the long flight ! ! !**

# Fluid Resuscitation

- Large bore IV (s)
- Non - burn site if possible
- Best tool , Urine Output . . . .
  - 0 . 5 cc / kg / hr adult
- 1 . 0 cc / kg / hr child [ < 30 kg ]
- Too much fluids can be just as bad as too little ! ! !

# Parkland Formula

- **$\% \text{ BSA} \times \text{Kg} \times 4 \text{ cc} = 24 \text{ hour total need}$** 
  - **1 / 2 over the first eight hours**
  - **1 / 2 over the next sixteen hours**
- **Lactate Ringers is the fluid of choice !**

# Modified Brooke Formula

- $\% \text{ BSA} \times \text{Kg} \times 2 \text{ cc} = 24 \text{ hour total need}$ 
  - $1 / 2$  over the first eight hours
  - $1 / 2$  over the next sixteen hours



# Wound Care

- After the initial resuscitation
- Remove smoldering clothing
- Do not remove adherent clothing
- Compensate for loss of thermoregulation
  - Provide comfort and pain control
  - Dry linen dressings , not gauze
  - *Do not cool wound , can advance the degree of burn*
  - Regulate ambient temperature

# Burn Center Transport Guidelines

- **Partial thickness over 15 %**
  - **Full thickness over 5 %**
- **Involvement of hands , perineum , face , feet**
  - **Inhalation**
  - **All high voltage**
  - **All chemical**
- **Patients with significant pre - existing disease**

WE'RE ON FINAL! NOW  
REMEMBER, WHEN WE TOUCH  
DOWN, *RUN LIKE HELL!*

