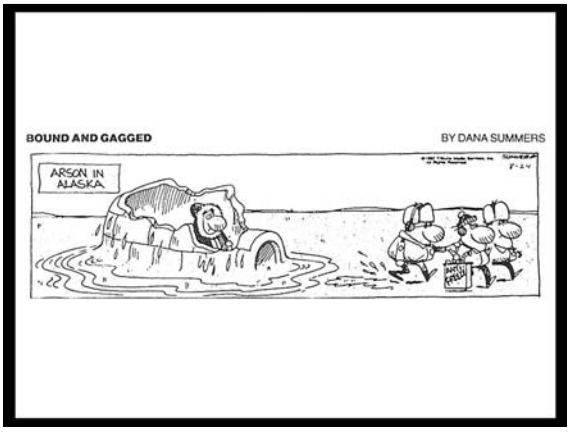


Emergency Burn Management

Ernest J. Grant, RN, MSN
Nursing Education Clinician

North Carolina Jaycee Burn Center
UNC Hospitals

2

Course Objectives

At the completion of this course, the learner will be able to:

- Describe the structure and function of the integumentary system.
- Define the movement of body fluids between plasma and interstitial compartments.

3

Course Objectives

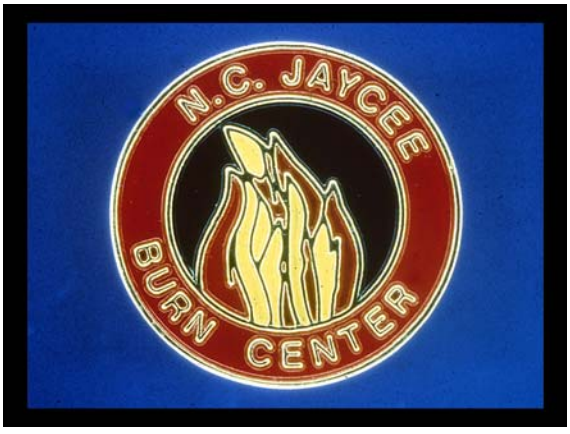
- Describe the pathophysiology of burn shock.
- Describe the four major sources of burn injury.
- Describe the three categories of burn injury by severity
- List factors contributing to inhalation injury.

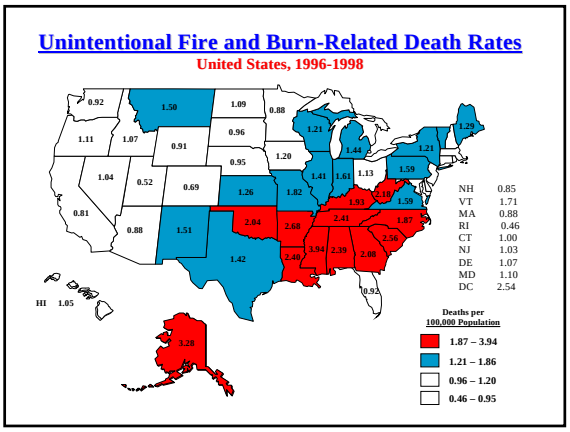
4

Course Objectives

- List the factors altering severity of burn injury.
- Describe the pathophysiology of burn shock.

5





Burn Statistics – North Carolina

- 40,000 burn/year
- 1,000-1,500 hospitalized yearly
- Annually … 200 – 300 deaths per year.
- Most burn victims are under the age of four and over the age of 60.

9

BURN PRONE PATIENTS

- Low socieo-economic status.
- **Rural Residents**… wood frame homes mobile homes.
- Aged
- Children
- Alcohol / Drug / Tobacco use

10

Situations to Suspect Suicide…

- Personal crisis
- Expressions of hopelessness
- Alcohol or drug abuse
- Prior history of emotional problems

11

Emotional Support

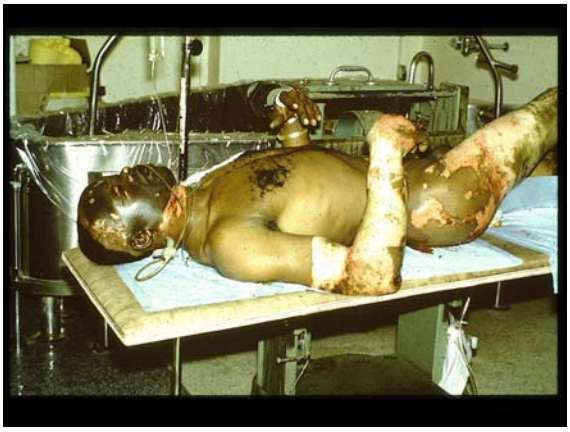
Guilt

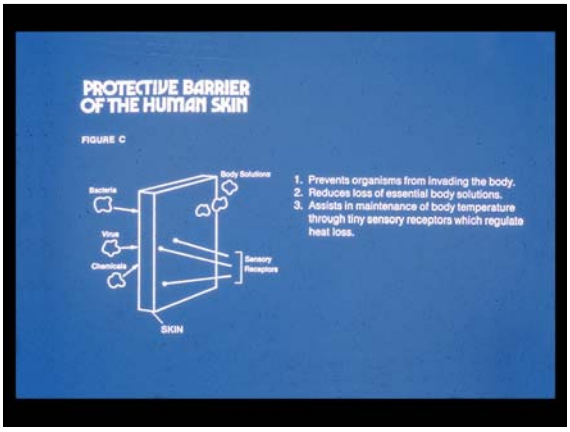
Fear

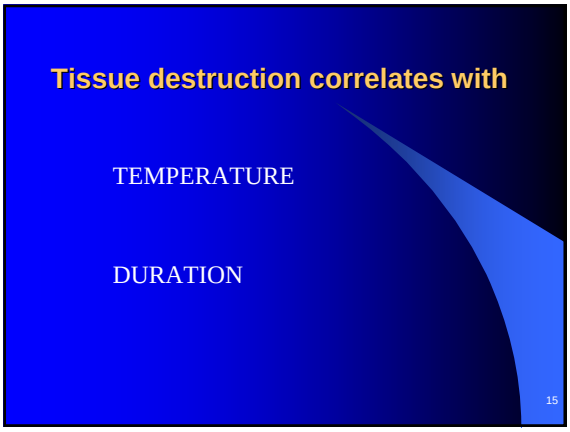
Anger

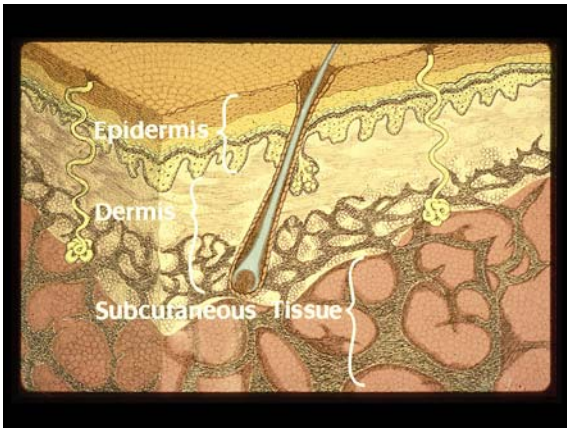
Depression

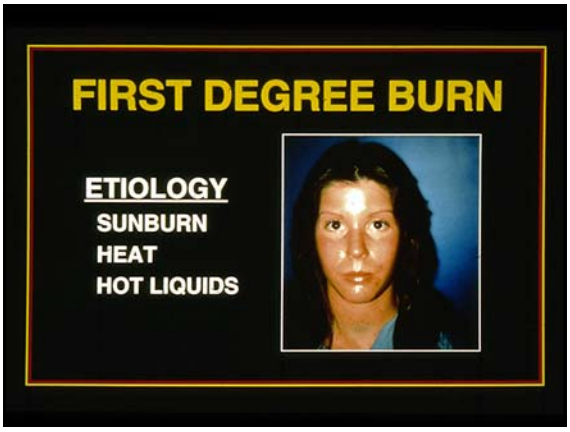
12




PROTECTIVE BARRIER
OF THE HUMAN SKIN
FIGURE C
Bacteria
Body Solutions
Virus
Chemicals
Sensory Receptors
SKIN
1. Prevents organisms from invading the body.
2. Reduces loss of essential body solutions.
3. Assists in maintenance of body temperature through tiny sensory receptors which regulate heat loss.

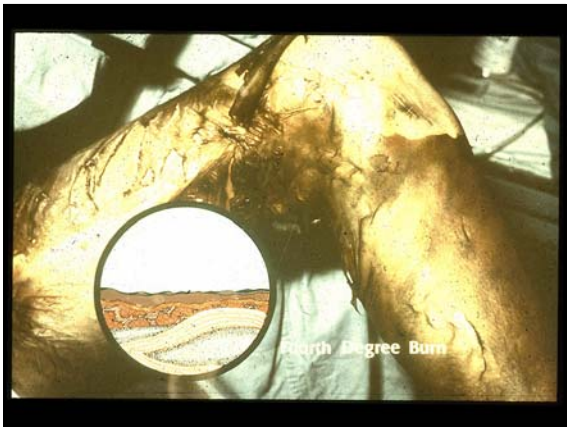

Tissue destruction correlates with
TEMPERATURE
DURATION
15

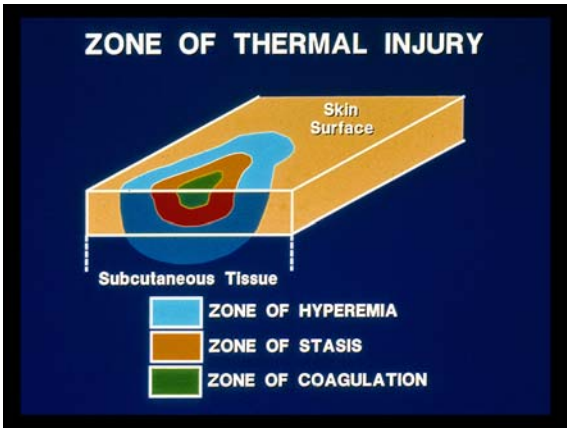

Epidermis
Dermis
Subcutaneous Tissue


FIRST DEGREE BURN
ETIOLOGY
SUNBURN
HEAT
HOT LIQUIDS


Second Degree
Partial
Thickness
Etiology
• Deep Sunburn
• Hot Liquids
• Flash Burns
• Chemicals
S & S
• Red
• Blistered
• Edema
• Painful


Third Degree
Full Thickness
Etiology
Fire
Deep Scald
Electricity
Chemicals
S & S
Pale Whit
Charred
Leathery
Painless

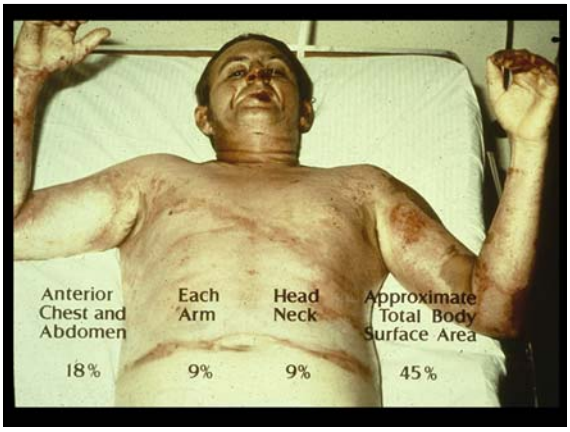

Fourth Degree Burn

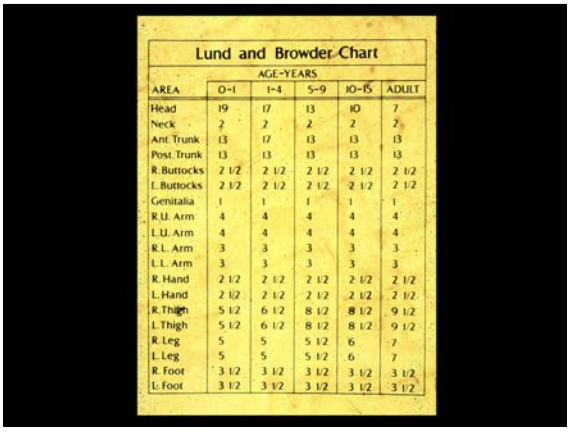

ZONE OF THERMAL INJURY
Skin Surface
Subcutaneous Tissue
ZONE OF HYPEREMIA
ZONE OF STASIS
ZONE OF COAGULATION


Immediate Measures to Save Life
Scene Safety
Stop the burning process
Remove clothing/jewelry
Check for smothering fabrics
22


Home remedies
Butter
Mustard
Mayonnaise
Vinegar
Vitamin E
Snuff
Leaches
Green leaves
Tooth paste
Potatoes
White shoe polish
Laying on of hands
Aloe plant
Ice
23


"RULE OF NINES"
9%
ANTERIOR
18%
POSTERIOR
18%
1%
18%
18%
24





Lund and Browder Chart

AREA	AGE-YEARS 0-1	1-4	5-9	10-15	ADULT
Head	19	17	13	10	7
Neck	2	2	2	2	2
Ant. Trunk	13	17	13	13	13
Post. Trunk	13	13	13	13	13
R. Buttocks	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
L. Buttocks	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
Genitalia	1	1	1	1	1
R.U. Arm	4	4	4	4	4
L.U. Arm	4	4	4	4	4
R.L. Arm	3	3	3	3	3
L.L. Arm	3	3	3	3	3
R. Hand	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
L. Hand	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2
R. Thigh	5 1/2	6 1/2	8 1/2	8 1/2	9 1/2
L. Thigh	5 1/2	6 1/2	8 1/2	8 1/2	9 1/2
R. Leg	5	5	5 1/2	6	7
L. Leg	5	5	5 1/2	6	7
R. Foot	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2
L. Foot	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2

Primary Survey

Scene Safety

A _ Airway

B Breathing

C Circulation

C C-Spine

27

Secondary Survey

- **A** – allergies
- **M** – Medications
- **P** – pain
- **L** – last meal
- **E** - environment

28

Airway Management

- Accounts for 20-30% of burn center admissions across the country.
- 60-70% of burn center fatalities.

29

Airway Management…

PATHOPHYSIOLOGY

Fatalities are due to:

- Asphyxiation
- Carbon monoxide intoxication

30

Inhalation Injury

Clinical suspicion

- Singed nasal vertebrae
- Peri oral burn
- Pharyngeal edema
- Hoarseness
- Carbonaceous sputum
- Bronchorrhea
- Closed space

Diagnosis

Hypoxemia (low CO_2)
Bronchoscopy

31

Airway Management

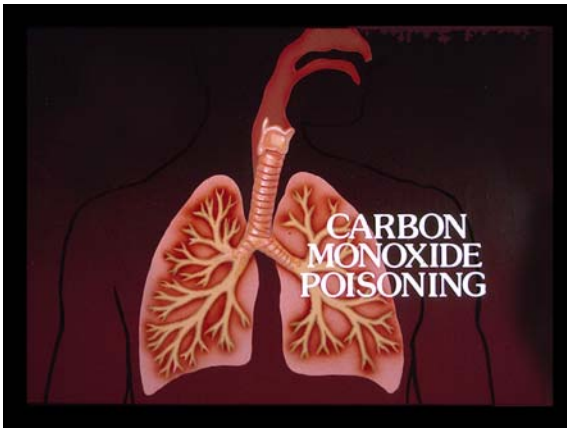
Three types of smoke inhalation injury

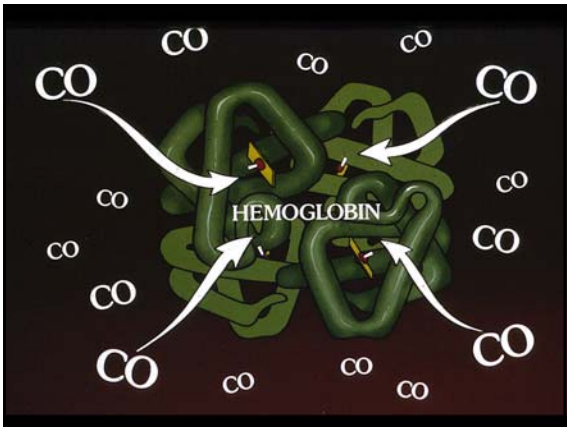
Carbon monoxide intoxication

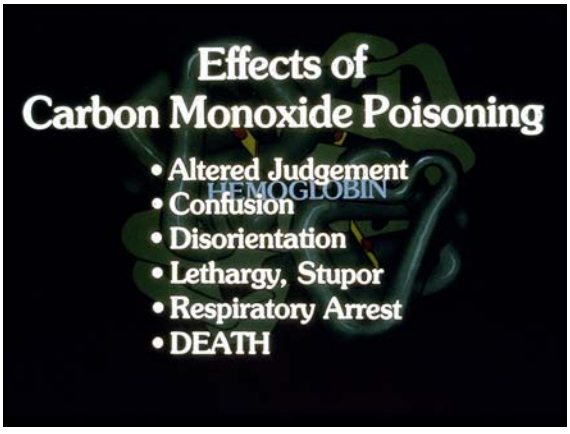
Inhalation above the glottis

Inhalation below the glottis

33







Airway Management

Carboxyhemoglobin levels

40 - 60 % altered LOC
15 - 40 % CNS dysfunction
10 - 15 % Asymptomatic

37

Airway Management

Carbon monoxide intoxication

Signs and symptoms may vary

Bright red skin

Severely hypoxic

38

Airway Management

Inhalation injury above the glottis

Most thermal injury to respiratory tract is limited to upper airway.

Most heat is absorbed and damage occurs in the pharynx and vocal cords.

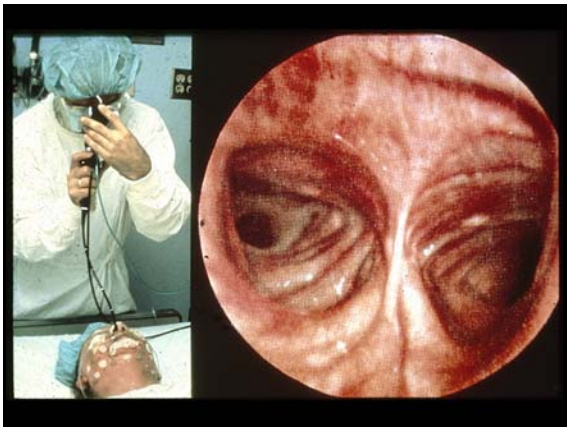
39

Airway Management

Inhalation injury below the glottis is **mostly associated with chemicals**

- Pathophysiological changes
- Impaired ciliary activity
- Edema
- Hypersecreation – edema
- Mucous membrane ulceration

40



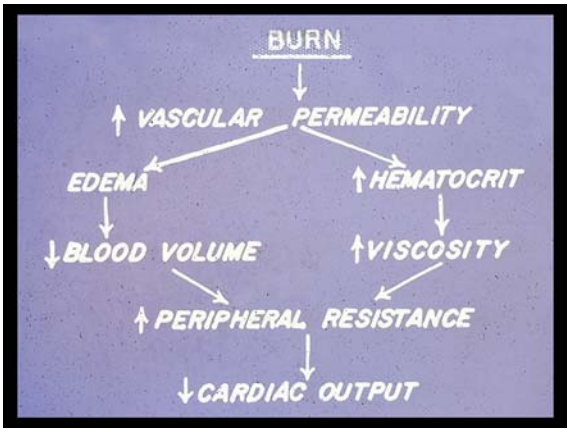
Airway Management

- **Initial management of the airway…**
  - 100% humidified oxygen
  - Endotracheal intubation

43

PATHOPHYSIOLOGY

50



Resuscitation Formula

- Adults: LR – 2-4 ml/wt (kg) / TBSA
- Children: LR – 3-4 ml/wt (kg)/TBSA
- 1/2 of the volume in first 8 hours
- 1/2 of the volume in following 16 hours
- Monitor patient's response

53

Goal of Resuscitation

Maintain vital organ function at the least physiologic cost

54

Urinary output …

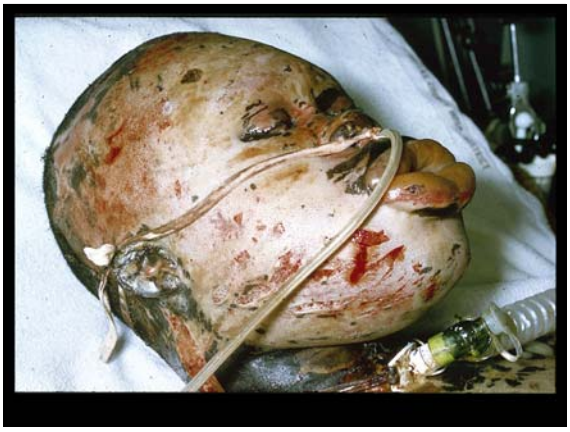
The most reliable non invasive indicator of resuscitation

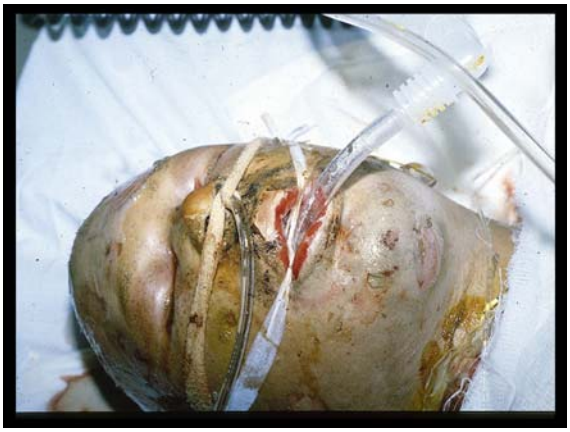
55

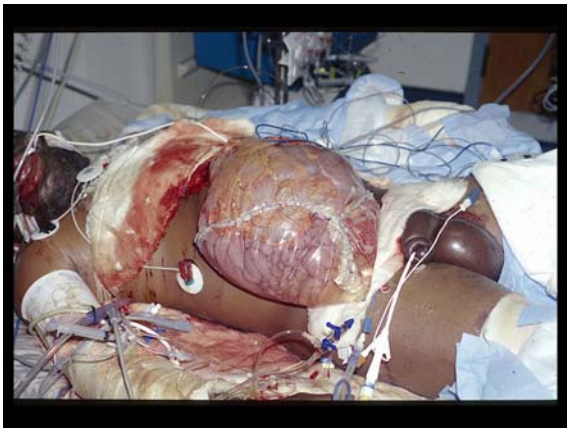
Management of Myogloubinuria

Fluids to obtain 75 – 100 ml hourly urinary output

57





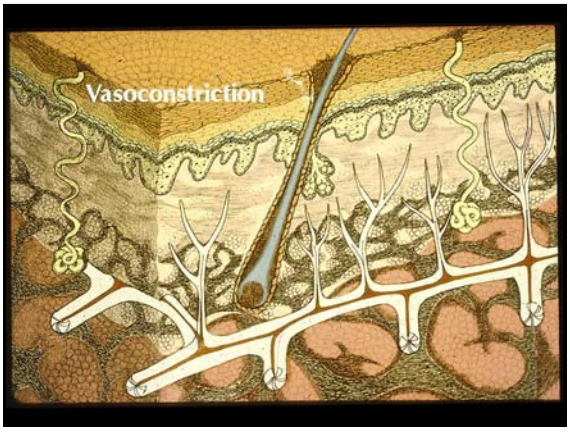


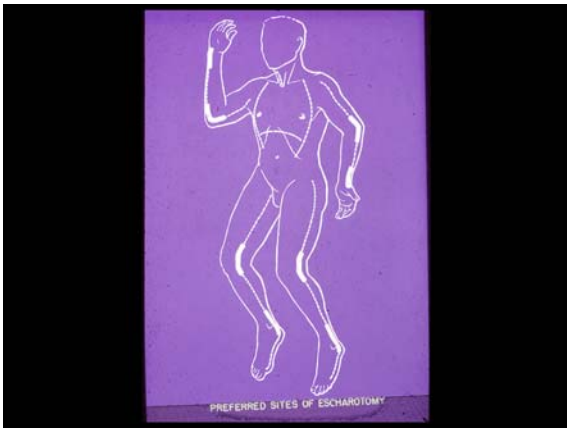
Indications for Escharotomy

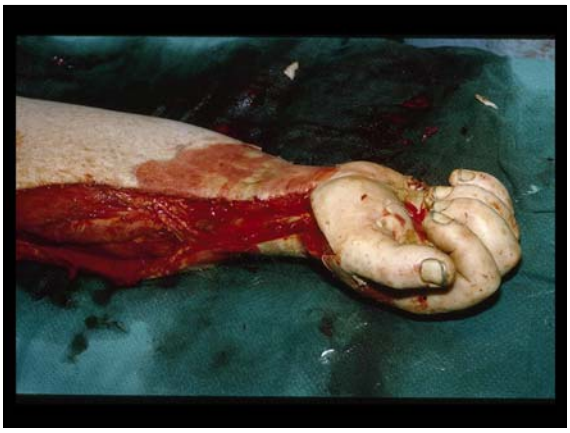
FIVE P's CONCEPT

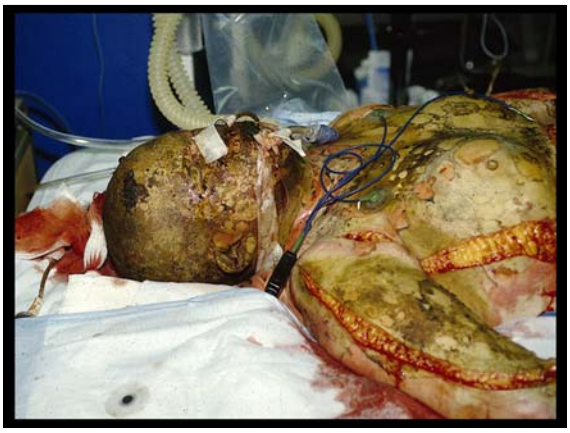
- **P**ain – intense, constant…
- **P**ulse – present, absent, intermittent
- **P**allor – cyanosis of extremities
  sluggish cap refill
- **P**ressure – gradually getting tighter
- **P**arathesia – numbness, tingling
  sensation

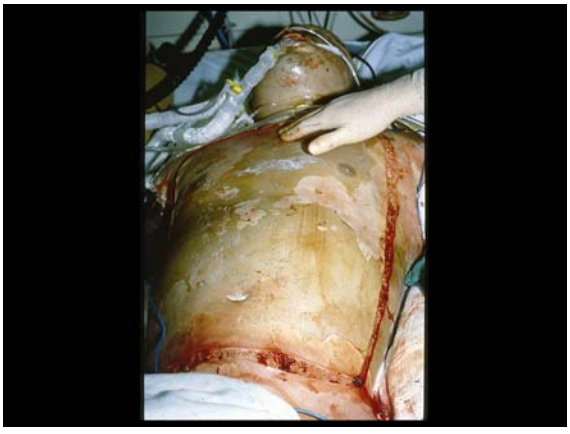
66

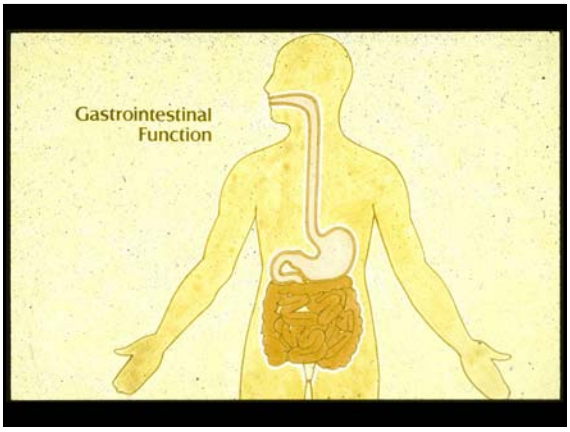

Vasoconstriction


PREFERRED SITES OF ESCHAROTOMY









Medications

- **P**ain – only give IV
- **T**etanus - consider booster
- **No** prophylactic antibiotics coverage
- **I**buprophen

81

Baseline studies

- HEMATOCRIC
- ELECTROLYTES
- BUN
- URINALYSIS
- BASELINE CHEST X-RAY

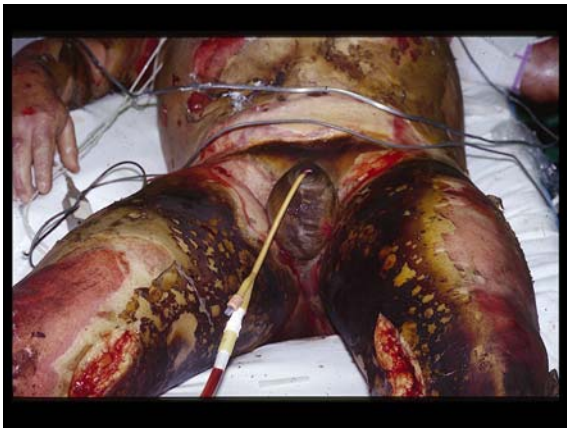
82

How Scalds Occur

- *Spills – 76%*
- *Immersion – 17%*
- *Steam - 7%*

84


GASOLINE



Wound Management

Special Thermal Burns

TAR – Cool with cold water

Remove tar

Assess for depth and severity

96

Types of Tissue Injury

Cutaneous burn with no underlying tissue damage

Cutaneous burn with deep tissue damage

98

Classification of Injury

"HIGH VOLTAGE" >1000 VOLTS

"LOW VOLTAGE" < 1000 VOLTS

99

Pathophysiology

Electrical energy ⇨ converts to heat

⇨ tissue destruction

100

Tissue Resistance to Current

Decreasing order

- **Bone**
- **Tendon**
- **Skin**
- **Muscle**
- **Blood vessel**
- **Nerves**

101

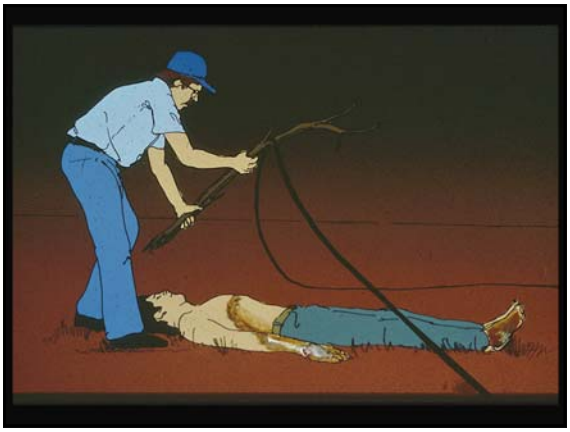
Determining factors in electrical injuries

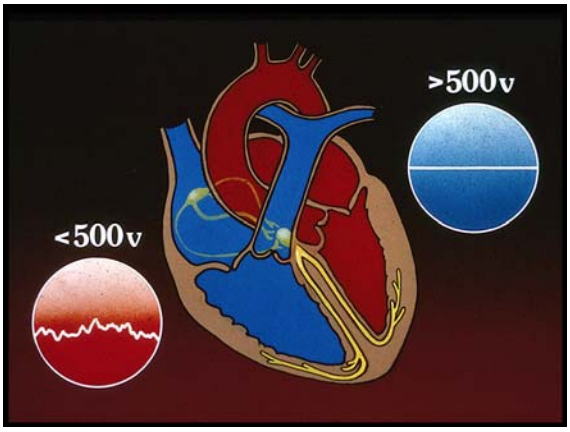
1. **Amperage**
2. **Voltage**
3. **Resistance**
4. **Type of current**
5. **Path of current**
6. **Duration of electrical contact**
7. **Surface area of contact point**

102

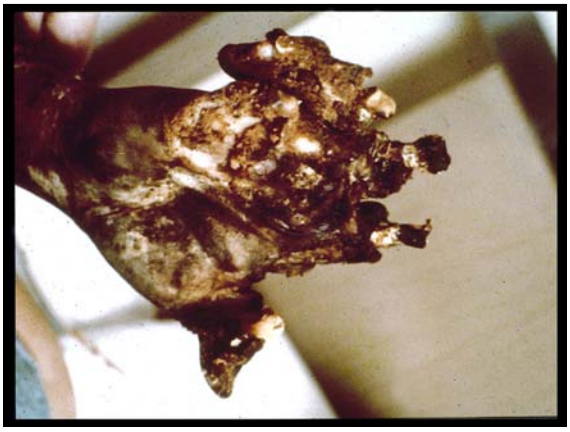

Common Entrance Wound

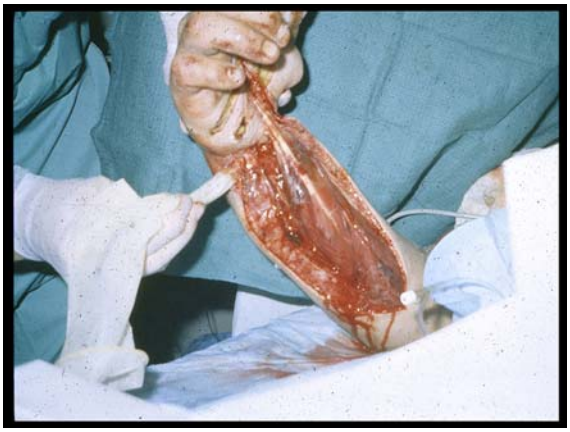

"Blow Out" Injury

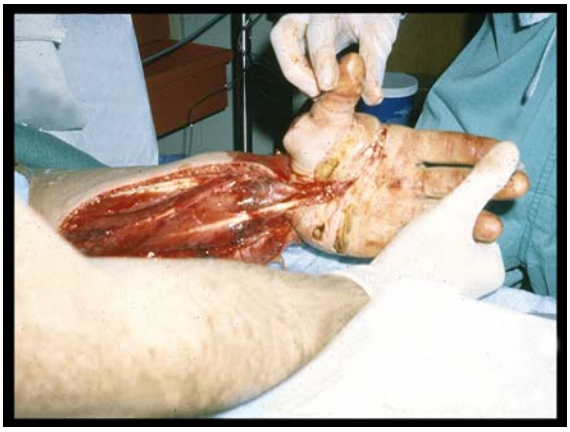


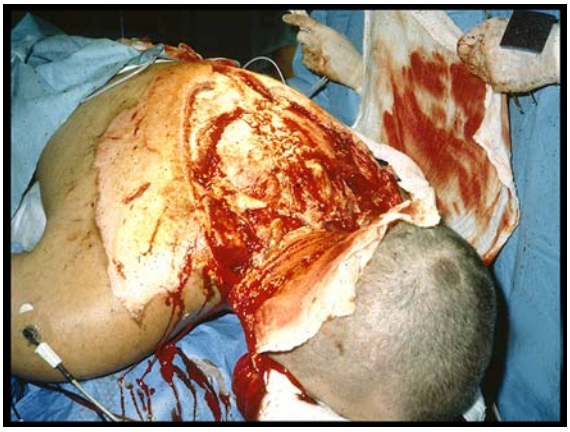

>500v
<500v

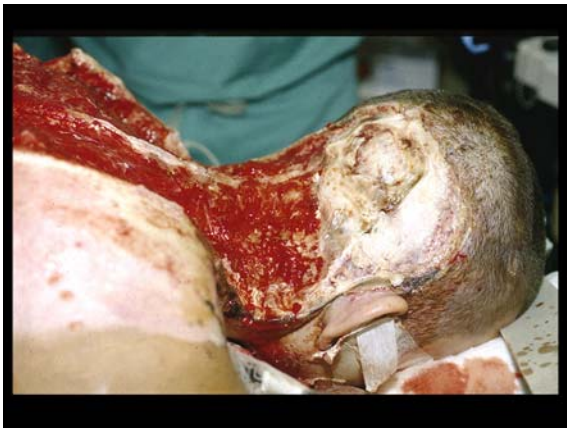

Before
After

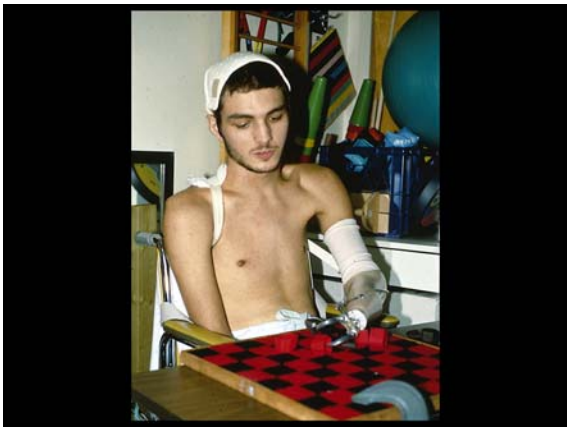


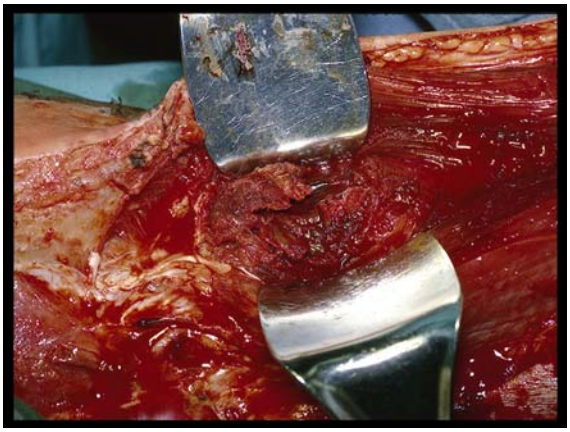


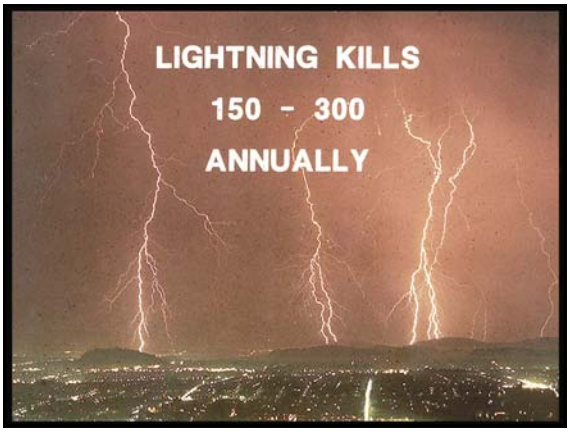


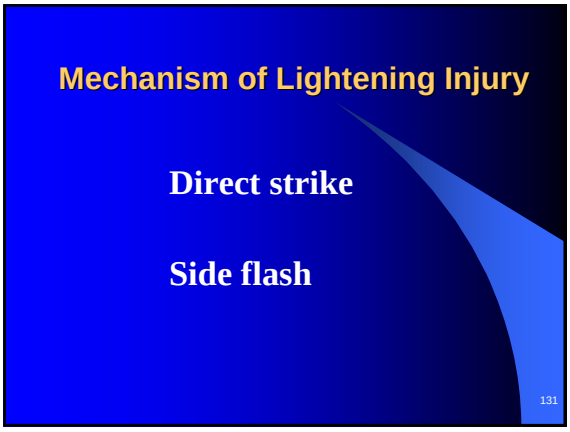


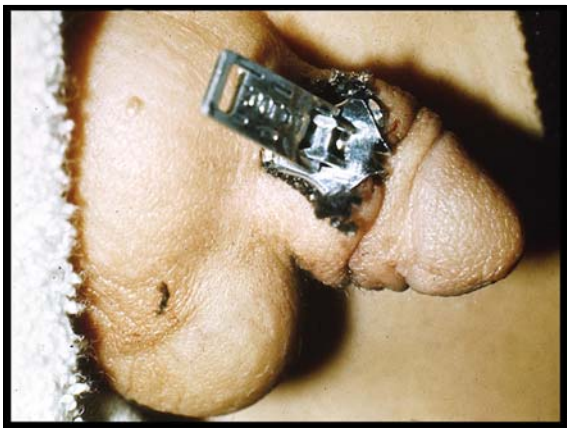


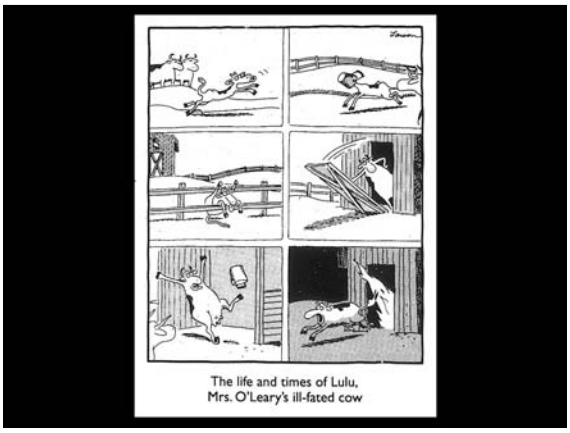


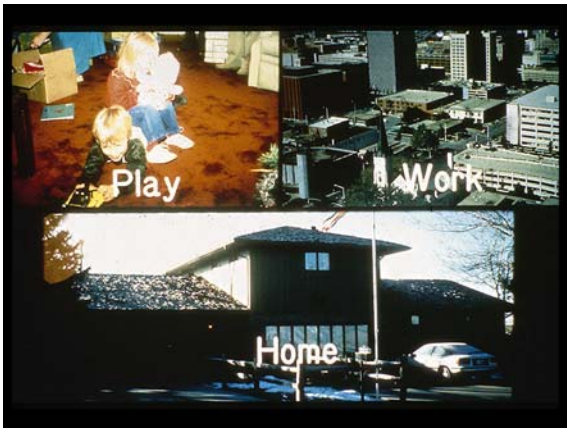



LIGHTNING KILLS
150 - 300
ANNUALLY


Mechanism of Lightening Injury
Direct strike
Side flash
131




The life and times of Lulu,
Mrs. O'Leary's ill-fated cow


Play
Work
Home


LYE
Lime
CAUTION
CORROSIVES


Hydrochloric
Lysol
TOILET BOWL
CLEANER
Sulfuric
INSTANT POWER
BRAIN
OPENER


Use approved cans
UL
FM
APPROVED

Systemic toxicity (6-24 hours)

- Pulmonary insufficiency
- Hepatic failure
- Renal failure

140

CHEMICAL BURNS…IMMEDIATE CARE

DO NOT DELAY TREATMENT

141

SUMMARY

- Remove all clothing
- Irrigate with copious amounts of water
- Beware of systemic toxicity
- Can be progressive

148

Pediatric Burn Injury

- **2,500 die from thermal injuries yearly**
- **10,000 suffer permanent disabilities**

149

Frost bite injury

- Affects parts of the body exposed to cold or high blood supply
  - hands
  - feet
  - face
  - ears
- May take 3-5 days to be revealed!

155

Frost bite pathophysiology

Body fluids freeze and ice crystals may form with in the tissue

DO NOT ATTEMPT TO RUB EXPOSED TISSUE!!

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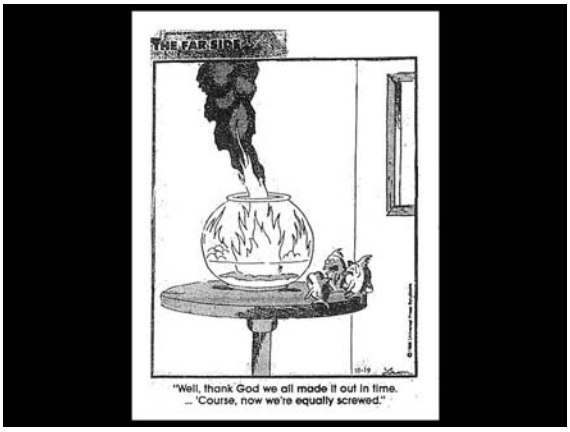
THE FAR SIDE
"Well, thank God we all made it out in time.
... 'Course, now we're equally screwed."