

PREHOSPITAL STABILIZATION TRAUMATIC BURN INJURY
 - 2017 AMERICAN BURN ASSOCIATION GUIDELINES
 AUGUST CORRALES, BSBA PARAMEDIC

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FINANCIAL DISCLOSURE STATEMENT

The practice of prehospital emergency care is an evolving art form that tries to keep up with evidence-based medicine. Always consult your local protocols and updated reference materials when practicing patient care.

I have no financial interest⁵ with manufacturers or any commercial products. I have no relevant financial disclosures to report.

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
OUR GOALS TODAY

- Beyond The Dermis – Relevant Burn Anatomy
- Pathology of a Burn
- Provide Update 2017 American Burn Association Guidelines
- Treatment Pearls
 - Target Therapeutics
 - Utilize Capnography
- Practice How We Play
 - Pediatric Case Review
- Best Practices

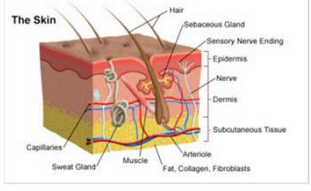
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BURN ANATOMY

BURN DEPTH

Non-infectious	Burn depth	Appearance	Healing	Example
Epidermal First degree burn	Epidermis	Hyperemic, papular, weeping pain	3-14 days	
Epidermal partial Second degree	Papular dermis	Moist, pink, blanching pain	3-4 weeks	
Deep partial Third degree	Reticular dermis	Leathery, waxy, dry, white, black, brown, tan, charred pain	3-8 weeks, may require skin graft	
Full thickness Fourth	Epidermis, dermis, fascia, muscle, bone	Dry white, charred	Never graft	

LAYERS OF SKIN




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BURN ANATOMY - RECOGNIZING BURN DEPTH


1st DEGREE BURNS

- Only epidermis is involved.
- Erythematous, pink or red, irritated dermis.
- No blisters, dry surface
- Painful and tender
- Minimal edema
- Spontaneous healing within 1 week.
- No scarring





2nd DEGREE BURNS

- Epidermis and papillary region of dermis
- Bright pink or red skin, inflamed dermis
- Erythematous with blanching & capillary refilling
- Intraepithelial blisters, moist surface
- Painful
- Moderate edema
- Spontaneous healing within 7-21 days.
- Minimal scarring
- Discoloration



Type of Burn ?

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BEYOND THE DERMIS – RELEVANT BURN ANATOMY

Depth	Level of Injury	Clinical Features	Result/Treatment
Superficial (first degree)	Epidermis	Dry, red; blanches; painful	Healing time 3-6 days, no scarring
Superficial partial thickness (superficial second degree)	Papillary dermis	Blisters; moist, red, weeping; blanches; severe pain to touch	Cleaning; topical agent; sterile dressing; healing time 7-21 days; hypertrophic scar; return of full function
Deep partial thickness (deep second degree)	Reticular dermis; most skin appendages destroyed	Blisters; wet or waxy dry; reduced blanching; decreased pain sensation to touch; pain present to deep pressure	Cleaning; topical agent; sterile dressing; possible surgical excision and grafting; scarring common if not surgically excised and grafted; earlier return of function with surgery
Full thickness (third degree)	Epidermis and dermis; all skin appendages destroyed	Waxy white to leathery dry and inelastic; does not blanch; absent pain sensation; pain present to deep pressure; pain present in surrounding areas of second-degree burn	Treatment as for deep partial-thickness burns plus surgical excision and grafting at earliest possible time; scarring and functional limitation more common if not grafted
Fourth degree	Involves fascia and muscle and/or bone	Pain to deep pressure, in the area of burn; increased pain in surrounding areas of second-degree burn	Healing requires surgical intervention

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BURN ANATOMY - RECOGNIZING BURN DEPTH


3rd DEGREE BURNS:

- Epidermis and reticular region of dermis
- Mixed red, waxy white skin
- Blanching with slow capillary refilling
- Broken blisters, wet surface (serous fluid oozes out)
- Sensitive to deep pressure but insensitive to light touch or soft pin prick.
- Marked edema
- Slow healing (heals in 3-5 weeks)
- Excessive scarring.

4th DEGREE BURNS:





- Extends into subcutaneous tissue
- White, yellow, brown leathery appearance.
- Thrombosed vessels, HB fixation.
- No blanching
- Poor distal circulation
- Edema is parchment like, leathery, rigid, and dry.
- Anesthetic skin
- Nails have pull out easily
- Area is depressed.
- Requires grafting for healing.
- Scarring is present.

• Type of Burn ?



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PATHOLOGY OF A BURN - INTRODUCTION TO BURN ZONES

Understructure	Burn depth	Appearance	Healing	Example
Superficial first-degree burn	Epidermis	Erythema, minor swelling, pain	7-14 days	
Superficial partial second-degree burn	Papillary dermis	Wet, pink, swollen, moderate pain	2-4 weeks	
Deep partial third-degree burn	Reticular dermis	Leathery, waxy, white, minor pain	3-6 weeks, skin grafting, debridement, need graft	
Full thickness burn	Epidermis, dermis (char-battered)	Dry, white, insensate	Need graft	

Zone of coagulation: it is the most central area of burn wound, where destruction is most severe and cellular necrosis is complete. The damage occurred is irreversible.

Zone of stasis: these cells are less injured and majority are initially intact but gradually becomes dead by the insufficiency of circulation (ischemia). Decreased tissue perfusion.

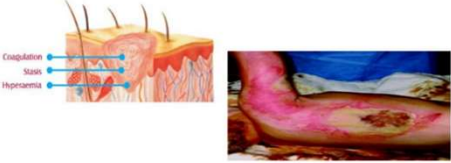
Zone of hyperemia: it is the most peripheral area, marked by excessively increased blood flow and minimal cellular injury. This area is not compromised unless infection of the burn wound occurs.



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BURN ZONES - A CLOSER LOOK

- **Zone of coagulation:** it is the most central area of burn wound, where destruction is most severe and cellular necrosis is complete. The damage occurred is irreversible.
- **Zone of stasis:** here cells are less injured and majority are initially intact but gradually becomes dead by the insufficiency of circulation (ischemia). Decreased tissue perfusion.
- **Zone of hyperemia:** it is the most peripheral area, marked by excessively increased blood flow and minimal cellular injury. This area is not compromised unless infection of the burn wound occurs.



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PATHOLOGY OF BURN TISSUE DAMAGE - COMPLICATIONS

- **THIRD SPACING**
 - Massive Capillary Leakage from injured tissue
 - Fluids Shift from intravascular space (capillaries, arteries & veins) to interstitial space
- **ESCHAR**
 - A collection of dead tissues within the wound that is flush with skin surface

Eschar → Inelasticity → Compartment Syndrome


Compartment Syndrome → Pressure >40 mm of Hg → Escharotomy

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ESCHAROTOMY

- A surgical procedure used to treat full thickness (third degree) circumferential burns
- Full thickness circumferential burns of an extremity or trunk (torso) can result in vascular compromise

Line of Incisions



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ESCHAROTOMY

Chest Escharotomy

- Considered when a circumferential burn of the chest wall results in respiratory compromise by restricting normal chest wall movement.
- Circumferential burns of the abdomen may also cause respiratory compromise by restricting diaphragmatic movement. E.g. Infants under 12 months



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Fasciotomy

- Fasciotomy or fasciectomy is a surgical procedure where the fascia is cut to relieve tension or pressure commonly to treat the resulting loss of circulation to an area of tissue or muscle.
- Done in Patients with Electrical Burns




FASCIOTOMY

FASCIA
Superficial – thin layer – of Connective Tissue underneath the skin that surrounds muscle tissue.
Composed primarily of collagen.

Forearm Fasciotomy Incisions

- Dorsal
- Volar




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DEBRIDEMENT

- Tangential Excision – Removing the outer layer (0.5 mm thick)

- Zones of Coagulation
- Zone of Stasis



Debridement

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SKIN GRAFTING

Classification of skin grafting

According to thickness

- Full thickness skin graft
- Partial thickness skin graft also called split thickness skin graft
- Composite graft – skin along with underlying tissue is grafted



Dermatome-harvesting Graft



Skin Grafting

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LET'S EVALUATE A PATIENT TOGETHER...

- Keep in mind the 3 Zones...
 - Coagulation – central area where most damage has occurred
 - Stasis – area next to Coagulation Zone, decreased tissue perfusion, gradually become ischemic
 - Hyperemia – generally outermost injury area, increased blood flow, minimally damaged

• Our Patient...

Your patient is the victim of an apartment fire. He has what appears to be red-tinged skin in areas absent burn; he is neurologically depressed, and suddenly decompensates into cardiac arrest... in which you were able to achieve ROSC. Let's take a look!

Source: <http://www.emdocs.net/modern-day-burn-resuscitation-moving-beyond-parkland-formula/>

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YOUR THOUGHTS?

- Zone of Coagulation?
- Clearly Defined Zone of Stasis?
- Zone of Hyperemia?

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YOUR THOUGHTS?

- Let's Play MythBusters...
 - Is this a...
Trauma Patient ???

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YOUR THOUGHTS?

The Burn Patient is a Special Type of Trauma Patient

Mary Ellen Billington, MD (EM Resident Physician, Parkland Memorial Hospital, Dallas, TX)

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PATHOPHYSIOLOGY OF A BURN

- WHAT THEY "DON'T" TEACH YOU IN PARAMEDIC SCHOOL

Hyper-Metabolic State

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PATHOPHYSIOLOGY OF A BURN

- WHAT THEY "DON'T" TEACH YOU IN PARAMEDIC SCHOOL

Hyper-Metabolic State

- Large Surface Area Involvement
- Multi-systems Injury

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PATHOPHYSIOLOGY OF A BURN

- WHAT THEY "DON'T" TEACH YOU IN PARAMEDIC SCHOOL

Hyper-Metabolic State

- Large Surface Area Involvement
- Multi-systems Injury
- ↑ VS & Metabolic Demands

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PATHOPHYSIOLOGY OF A BURN

- WHAT THEY "DON'T" TEACH YOU IN PARAMEDIC SCHOOL

Hyper-Metabolic State

- Large Surface Area Involvement
- Multi-systems Injury
- ↑ VS & Metabolic Demands
- Will Last Weeks to Months

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PATHOPHYSIOLOGY OF A BURN

- WHAT THEY "DON'T" TEACH YOU IN PARAMEDIC SCHOOL

- Hyper-Metabolic State

How are we going to fix the skin...
What's the Building Block for Cellular Repair?

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PATHOPHYSIOLOGY OF A BURN

- WHAT THEY "DON'T" TEACH YOU IN PARAMEDIC SCHOOL

- Hyper-Metabolic State
- Significant Nutritional Demands - Protein
- Constant Monitoring
 - Electrolytes
 - pH Balance
 - Renal Output

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YOUR THOUGHTS?

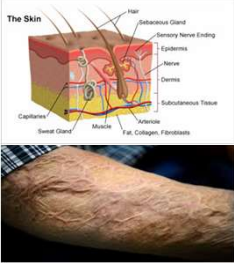
The Burn Patient is a Special Type of Trauma Patient

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- ❖ Hypermetabolic
- ❖ Increased Demand Protein
- ❖ Acid Base Balance - Electrolyte

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PATHOLOGY OF A BURN
- FROM DAMAGE TO HEALING



The Skin

- **Inflammatory Phase**
 - Neutrophils - Vasodilation
 - Monocytes - Extravasation
 - Macrophages - Edema
- **Proliferation**
 - Keratinocytes - Wound Closure
 - Fibroblasts - Generating Connective Tissue
- **Remodeling**
 - Collagen - Wound Maturation
 - Elastin - Scarring

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PATHOLOGY OF A BURN

- **Local Area (Skin)**
 - Dilation of Small Vessels (Histamine Response)
 - Increased Capillary Permeability (Edema Formation)
- **Systemic Shock**
 - Hypovolemia, Cardiogenic, Septic
- **Biochemical**
 - ↓ Na, Cl ↑K
 - ↓ Proteins (Hypoproteinemia)
- **Hematological**
 - ↑ Hemoconcentration (Serum Loss)
 - ↑ Viscosity (RBC, WBC, Platelet Aggregation)
 - Anemia (Destruction of RBC's)
- **Key Concerns - End Organ Failure (Renal)**
- **Complications – Compartment Syndrome**

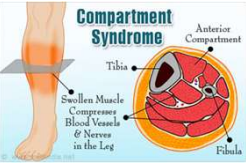
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PATHOLOGY OF A BURN - COMPARTMENT SYNDROME

THIRD SPACING

- Massive Capillary Leakage from injured tissue
- Fluids Shift from intravascular space (capillaries, arteries & veins) to interstitial space
- Creates Pressure – Compressing Arteries & Veins Affecting Blood Supply to Nerves and Tissue Function

LEADS TO COMPARTMENT SYNDROME




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SO THE REAL QUESTION BECOMES... WHAT CAN I DO?

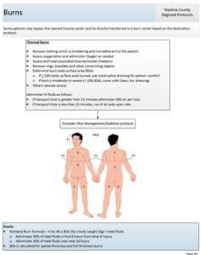
PART 1

Washoe County Regional EMS Protocols



WASHOE COUNTY HEALTH DISTRICT
EMPOWERING QUALITY OF LIFE

Burns



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STABILIZATION OF TRAUMATIC BURN INJURY PATIENT 2017 AMERICAN BURN ASSOCIATION GUIDELINES

HIGHLIGHTS

- **Patient Assessment Tools**
 - Estimating TBSA
- **Intubate or Not to Intubate...**
 - Early Intubation Guidelines
- **Intravenous Fluid Therapy**
 - Revised Fluid Consensus Model
 - Addresses Pediatric Metabolic Needs

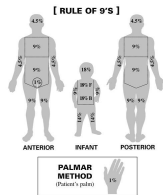
CHANGES

- **Fluid Consensus Model**
 - Replaces Parkland Burn Formula
 - Volume Adjustments For Pediatric Patient
 - Considers Burn Cause/MOI
- **Pediatric Patients have greater metabolic needs and requiring adequate glucose and glycogen stores to promote tissue repair & long-term healing.**

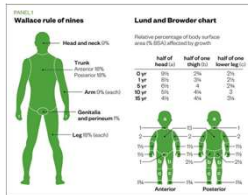
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ESTIMATING BURN SURFACE AREA 2017 ABA GUIDELINES

PRE-HOSPITAL • INITIAL ASSESSMENT WALLACE RULE OF NINES



HOSPITAL • CONTINUED CARE LUND-BROWDER CHART (MORE ACCURATE)

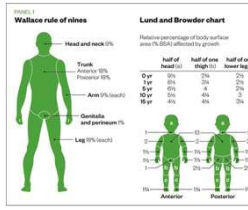
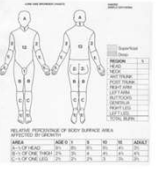


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ESTIMATING BURN SURFACE AREA 2017 ABA GUIDELINES

PRE-HOSPITAL • INITIAL ASSESSMENT LUND-BROWDER ADULTS

Lund and Browder charts



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INTUBATION CRITERIA 2017 ABA GUIDELINES

INDICATIONS FOR EARLY INTUBATION

- Signs of Airway Obstruction
 - Hoarseness, Stridor, Dysphagia
- TBSA ≥ 40%
- Extensive Deep Facial Burns
- Significant Risk of Edema
- Signs of Respiratory Compromise
 - Accessory Muscle Use
 - Inability to Clear Secretions
 - Poor Oxygenation
- Altered Mental Status

ADULT INTUBATION GUIDELINES

- Endotracheal Tube Size
 - Cuffed: 6.0 – 8.5
- ETT Placement (Depth in cm)
 - 3x ETT Size @ Teeth

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INTUBATION CRITERIA 2017 ABA GUIDELINES

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PEDIATRIC INTUBATION GUIDELINES

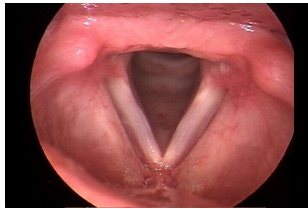
- Endotracheal Tube Size
 - Uncuffed: (Age / 4) + 4
 - Cuffed: (Age / 4) + 3
- ETT Placement (Depth in cm)
 - Age ≥ 1 Year: (Age / 2) + 13 cm
 - Age < 1 Year: (Weight kgs / 2) + 8 cm

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INTUBATION CRITERIA 2017 ABA GUIDELINES

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INTUBATION CRITERIA 2017 ABA GUIDELINES

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 - Poor Oxygenation
- Altered Mental Status



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FLUID REPLACEMENT FORMULA 2017 ABA GUIDELINES

ADULT (Note *: Give ½ in first 8 hours; Give remainder over next 16 hours)

- Non-Electrical *
 - $2 \text{ mL} \times \text{Kg} \times (\% \text{ BSA})$
 - = Total fluids for 24 Hours
- Electrical *
 - $4 \text{ mL} \times \text{Kg} \times (\% \text{ BSA})$
 - = Total fluids for 24 Hours

PEDIATRIC (Note *: give ½ in first 8 hours; Give remainder over next 16 hours)

- Non-Electrical *
 - $3 \text{ mL} \times \text{Kg} \times (\% \text{ BSA})$
 - = Total fluids for 24 Hours
- Electrical *
 - $4 \text{ mL} \times \text{Kg} \times (\% \text{ BSA})$
 - = Total fluids for 24 Hours

❖ For Pediatrics < 30 kgs, Add D5LR based on 4-2-1 rule
❖ EMS: LR or NS with D10 KVO – Monitor BGL

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UMC

Special Circumstances - Burns

UMC Burn Activation Criteria - Update

- ♦ Intermediate Activation Criteria
 - Adult (Age ≥ 15) 20% TBSA – 2nd Degree or Greater
 - Ped (Age ≤ 14) 15% TBSA – 2nd Degree or Greater
 - Electrical Injury 1000 volts or Above
 - Commercial or Occupational Equipment
 - Any burn patient who arrives mechanically ventilated
 - Inhalational Injury/Respiratory Distress
 - RR > 25 or SpO2 < 93%
- ♦ Activation Criteria
 - Trauma Physician Bedside Activation
 - Patient Meets 1 out of 5 Criteria

SNHD - ABA Fluid Resuscitation Guidelines

- ♦ SNHD EMS Protocols
 - Adult (Age ≥ 13) 500 mL NS Bolus
 - Child (Age 6-12) 250 mL NS Bolus
 - Ped (Age ≤ 5) 125 mL NS Bolus
- ♦ American Burn Association
 - ABA Fluid Resuscitation Guidelines

	Name or Code	Electrical Injury
Adult	2 mL x kg x BSA Lactated Ringers	4 mL x kg x BSA Lactated Ringers
Children	3 mL x kg x BSA Lactated Ringers	4 mL x kg x BSA Lactated Ringers
Children and Infants (≤ 30 kg)	2 mL x kg x BSA D5LR	4 mL x kg x BSA D5LR
	Maintenance Bolus	Maintenance Bolus

2nd degree burns or above with BSA > 20%
add 2 large bore IV access sites

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FLUID REPLACEMENT FORMULA
2017 ABA GUIDELINES

Why Change... ?

- **PARKLAND BURN FORMULA**
4 mL x Kg x (% BSA)
= Total fluids for 24 Hours
- **MODIFIED FLUID REPLACEMENT**
2 - 4 mL x Kg x (% BSA)
= Total fluids for 24 Hours
Give ½ over first 8 hours....

Avoid Iatrogenic Injury...



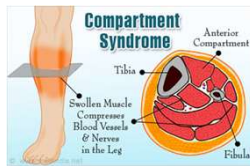
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COMPLICATIONS OF OVERHYDRATION

BURN INJURY PATHOLOGY

- **THIRD SPACING**
- Massive Capillary Leakage from injured tissue
- Fluids Shift from intravascular space (capillaries, arteries & veins) to interstitial space

SIMILAR TO COMPARTMENT SYNDROME



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VASCULAR ACCESS – PEARLS

- Lactated Ringers or Normal Saline
- **URINARY OUTPUT GOALS**
- **Adult**
0.5 mL / Kg / Hour
- **Pediatric**
1.0 mL / Kg / Hour
- **Obtain Vascular Access with signs of**
 - Hypoperfusion
 - BSA ≥ 20% (2ND or 3RD Degree Burns)
 - Any 3RD Degree Burn
- **Obtain BGL Pediatric Patients < 30 kgs**
 - Hospital: 4-2-1 Titration & Do Not Adjust Rate
 - EMS: May 'Piggyback' D10 KVO

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SO THE REAL QUESTION BECOMES...
WHAT ELSE CAN I DO?

PART 2



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THE IMPORTANCE OF THERAPEUTIC TARGETS



▪ What do you see?

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THE IMPORTANCE OF THERAPEUTIC TARGETS



- Not having a Therapeutic Target in mind leads to inappropriate patient care
- Overdosing
- Underdosing
- Inadequate Interventions
- Iatrogenic Injury

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THE IMPORTANCE OF THERAPEUTIC TARGETS



- AGE APPROPRIATE
- BP
- Heart Rate
- Respiratory Rate
- Blood Glucose
- Temperature
- SPO2 (Pulse Oximetry)
- Waveform Capnography & ETCO2

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THERAPEUTIC TARGET – Patient Management

PRE-HOSPITAL

- AGE APPROPRIATE
- BP
- Heart Rate
- Respiratory Rate
- Blood Glucose
- Temperature
- SPO2 (Pulse Oximetry)
- Waveform Capnography & ETCO2

HOSPITAL

- AGE APPROPRIATE
- Arterial Blood Gas
- Hematology Values
- Coagulation Values
- Lab Chemistry Values
- Urinary Output

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PEDIATRIC THERAPEUTIC TARGETS (PALS)

**AGE APPROPRIATE
SYSTEMIC BLOOD PRESSURE**

Guidelines for Hypotension

PALS Guidelines for Hypotension

- Neonate (0 to 28 days old): SBP < 60 mmHg
- Infants (1 month to 12 months): SBP < 70 mmHg
- Children (1 yr to 10 yrs): SBP < 70+(2xage in years) mmHg
- Children (over 10 yrs): SBP

**AGE APPROPRIATE
VITAL SIGNS**

Guidelines for Vital Signs

General Vital Signs and Guidelines

Age	Heart Rate (beats/min)	Blood Pressure (mmHg)	Respiratory Rate (breaths/min)
Premature	110-170	SBP 55-75 DBP 35-45	40-70
0-3 months	110-160	SBP 65-85 DBP 45-55	30-55
3-6 months	110-160	SBP 70-90 DBP 50-65	30-45
6-12 months	90-160	SBP 80-100 DBP 55-65	22-38
1-3 years	80-150	SBP 90-105 DBP 55-70	22-30
3-6 years	70-120	SBP 95-110 DBP 60-75	20-24
6-12 years	60-110	SBP 100-120 DBP 60-75	16-22
> 12 years	60-100	SBP 110-135 DBP 65-85	12-20

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INTRODUCING CAPNOGRAPHY

Small pH holes deliver pillow of oxygen around both nose and mouth

Uni-Junction™ of sampling ports prevents dilution from non-breathing source

Increased surface area provides greater sampling accuracy in the presence of the tidal volume

Baseline Capnography Waveform from www.capnography.com

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WAVEFORM CAPNOGRAPHY

UNDERSTANDING THE WAVEFORM

RESPIRATORY PHASES

- I: Dead Air Space 50-150 mL
- II: Alveolar Expiration Begins
- III: Peak Alveolar Expiration (β)
- 0: Inhalation (O₂ Displacing CO₂)

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CAPNOGRAPHY

WAVEFORMS

- Plateau has curved, "shark-fin" appearance
 - Bronchospasm
 - asthma
 - COPD
- Slow rate with increased EtCO₂
 - Hypoventilation
 - Partial airway obstruction
- Rapid rate with decreased EtCO₂
 - Hyperventilation
 - Hypoperfusion
- Decreased EtCO₂, variable waveform
 - Intermittent apnea
 - Patient is talking

VALUES (mm Hg)

- > 60 Hypercarbia
- High Consider Respiratory Failure
- 35 – 45 Normal (HCO₃ Balance)
- 30 Pre-hospital TBI Target
- Low Consider Sepsis
- < 10 Incompatible With Life

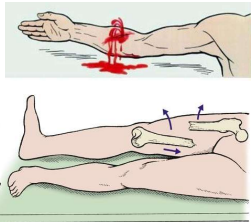
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HERE'S YOUR SCENARIO...
PRACTICE HOW WE PLAY!



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PHYSICAL FINDINGS



Additional Physical Findings

- BURN INJURIES
 - 2nd Degree Burn
 - Left flank, Left tibia
 - 3rd Degree to
 - Abdominal LUQ, LLQ
 - Left Pelvis & Groin
 - Left Anterior Thigh
- TBSA ?

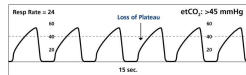
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YOUR FINDINGS

11 YOM, 77 lbs

▪ GCS - 15

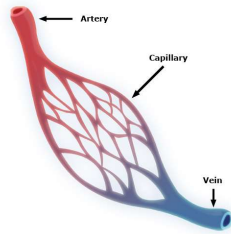
1. BP 82/64
2. HR 128
3. RR 24 Labored
4. SPO₂ – 97% RA
5. VBGL – 74 mg/dL
6. Temp – 98.6 Tympanic
7. Pain 10+/10



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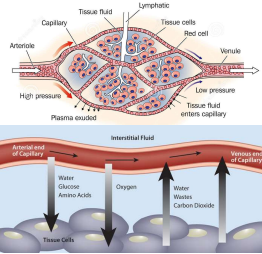
BEST PRACTICES IN TRAUMA STABILIZATION & BURN CARE MANAGEMENT

- **Best Pre-hospital Treatment Mindset**
 - **Keep Them Warm**
 - Constricted Vessels Cannot Adequately Perfuse Tissue
 - **Avoid Hypothermia**
- **Maintain Functional Anatomical Position**
 - Rolled Gauze (Kerlix) in Palm
 - 4 x 4's between digits of the hand/feet
- **Consider elevating extremities if possible, to avoid edema accumulation**



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BEST PRACTICES IN TRAUMA STABILIZATION & BURN CARE MANAGEMENT



- **Determine Your Therapeutic Treatment Targets**
- **Assess Injury / Illness**
- **Prioritize Treatment Plan**
 - Correct Life Threats First
 - Preserve Tissue Perfusion
 - Appropriate Pain Management
- **Burn Care Management**
 - Preserve Tissue Function
 - Warm & Avoid Vasoconstriction
- **Reassess Interventions to Maintain Tissue Perfusion**

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REFERENCES

1. Bittner, E., Shank, E., Woodson, L. et al. February 2015. Acute Perioperative Care of the Burn Injured Patient. *Anesthesiology* 2015, Vol.122, 448-464. doi:10.1097/ALN.0000000000000559. As found in: <http://anesthesiology.guide.starfa.org/article.aspx?articleId=4091367>
2. Nargode, A. August 10, 2016. Burns: Surgical Management. *Health & Medicine*. As found in: <https://www.slideshare.net/vahafint/burns-surgical-management>
3. Bhagwat, A. September 1, 2014. Burns, Wounds & Pressure Sores. *Health & Medicine*. As found in: <https://www.slideshare.net/prjyankar03/burns-wounds-pressure-sores>
4. Billington, M. et al. September 28, 2016. Modern Day Burn Resuscitation- Moving Beyond the Parkland Formula. As found in <http://www.emdocs.net/modern-day-burn-resuscitation-moving-beyond-parkland-formula/>
5. Pediatric Advanced Life Support Algorithm 2018. As found in: <https://www.acls-bls.com/2018/08/01/peds/>
6. Nandyala, November 8, 2016. Capnography: Pocket ICU. As found in: <http://pocketou.com/index.php/2016/11/08/capnography/>
7. Neopoc, July 5, 2017. Rule of Nines. As found in: <http://notesmedicalstudent.blogspot.com/2017/07/rule-of-9-burn.html>
8. Toussaint, J. and Singer, A. September 30, 2014. The Evaluation and Management of Thermal Burns. *Clinical and Experimental Emergency Medicine*. 2014; 1(1): 8-18. As found in: <https://www.semanticscholar.org/document/01681818>
9. Washington State Department of Health Office of Community Health Systems Emergency Medical Services and Trauma Systems. May 17, 2017. As found in: <https://www.doh.wa.gov/OfficeofCommunityHealthSystems/OCES/OCES.pdf>
10. Rowan, M. et al. "Burn Wound Healing and Treatment: Review and Advancements." *Critical Care* 19 (2015): 243. PWC. As found in: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4464872/>

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