



**Don't get**

**BURNED**

**By Burn Care**

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- **EMS burn care presents unique challenges in assessment and management**
- **EMS encounters with major burns often occur in high stress/high distraction situations**
- **Is your care based on myth, tradition, expediency, or current practice?**



Photo courtesy of Vito Maggiolo

# Goals and Objectives for This Experience

*At the end of this presentation, the EMS provider will*

- 1. Have a better understanding of the multiple priorities in burn care**
- 2. Be able to make sound treatment decisions based on current best practices**
- 3. Understand the value and limitations of prehospital treatment**
- 4. Make informed transport decisions based on patient priorities and not just protocol**



This picture is courtesy of Aaron Burns of [Local 2551](#).



# The Basics

## First Degree Burns



# The Basics

## ▶ Second Degree Burns



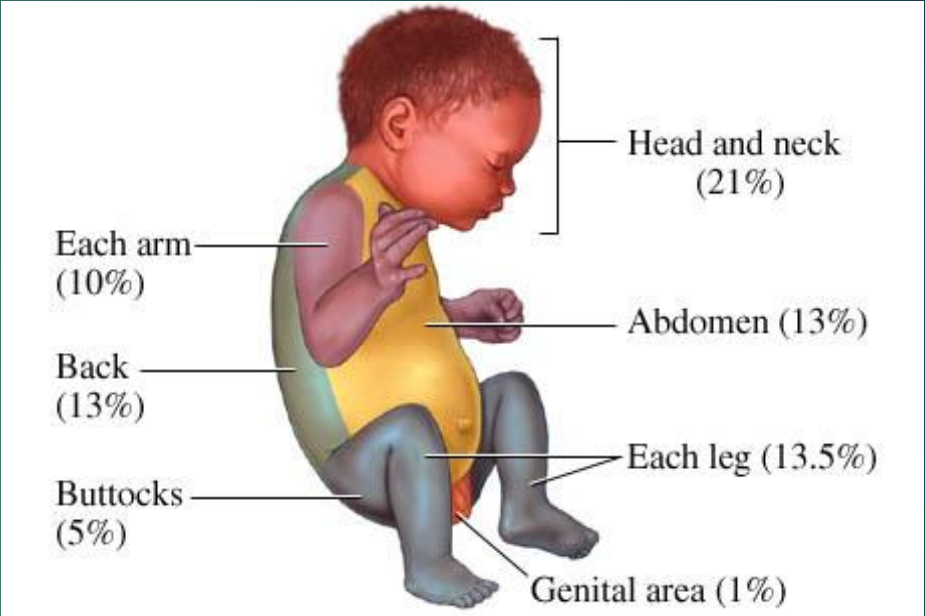
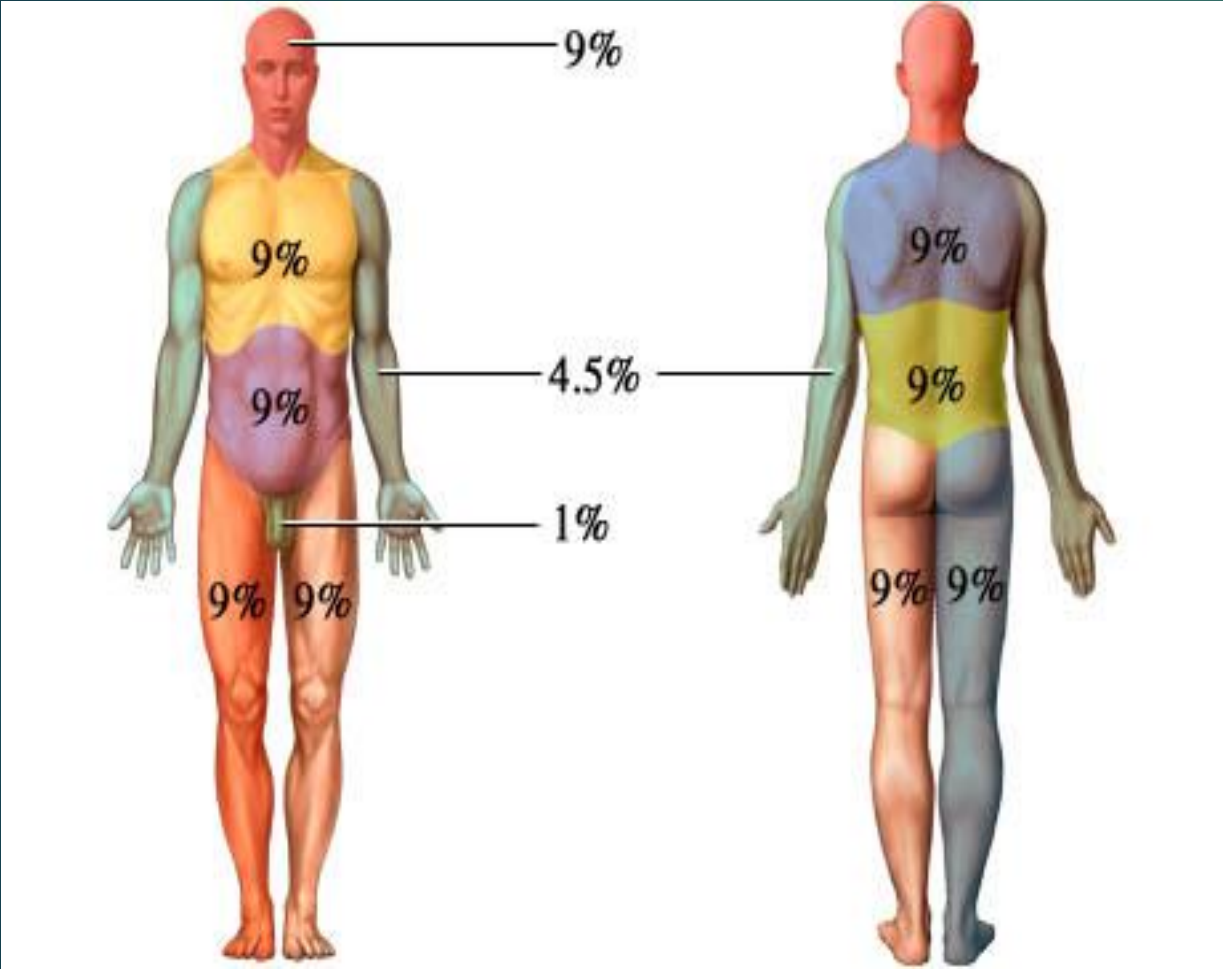


# The Basics

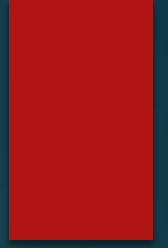
## ▶ Third Degree Burns



# The Basics



Photos: WebMD



# **Getting Beyond The Basics:**

## **Treating the Patient With Major Burns**

- ▶ **Understand what kills major burn victims immediately:**

- Unrecognized airway issues**

- Inadequate treatment of shock**

- Undetected medical or traumatic conditions**

- ▶ **Understand what kills major burn victims later:**

- Infection**

- Organ failure**



# Major Burns

- ▶ **2<sup>nd</sup>/3<sup>rd</sup> degree burns greater than 15% BSA**
- ▶ **3<sup>rd</sup> degree burns greater than 5% BSA**
- ▶ **Respiratory burns**
- ▶ **Burns of the eyes/ears/face/hands/feet/genitalia**
- ▶ **Peds/Geriatrics**



# **Don't get BURNED by:** **Inadequate Airway Management**

- ▶ **Early control of the airway is essential**
- ▶ **Look for evidence of inhalation burn, facial burns, severe chest burns. Assess lung sounds and chest expansion**
- ▶ **The burned airway can swell rapidly**
- ▶ **Don't be fooled if there is "no severe respiratory distress"-things can go from bad to worse quickly**
- ▶ **Tube early, but be prepared for surgical airway intervention**

<http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4624587>



# **Don't get BURNED by:** **Inadequate Airway Management**

- ▶ **Don't forget to consider smoke inhalation/carbob monoxide poisoning**
- ▶ **Pulse oximetry may be unreliable**
- ▶ **If the patient does not require intubation, give 100% O<sub>2</sub> via NRB. Humidification is preferable, but not immediately essential unless transport times are long**
- ▶ ***REASSESS FREQUENTLY!***



# Don't get **BURNED** by: Use of Prehospital IV Fluids

## Parkland Formula

Volume of Lactated Ringers solution:

$$4\text{ml} \times \text{BSA}(\%) \times \text{weight}(\text{kg})$$

Give half of the  
solution for the  
**first 8 hours**

Give the other half  
of the solution for the  
**next 16 hours**

There are other formulas, Parkland is the most commonly used

# **Don't get BURNED by:** **Use of Prehospital IV Fluids**

## **Example:**

- ▶ **4ml x 50% bsa burned x 80 kg = 16,000 ml (16 L) RL in 24 hours**
- ▶ **Give 8 L in the first 8 hours (1L/hr or approx. 17ml/min)**
- ▶ **Give 8 L over the next 16 hours (500 ml/hr or approx. 8ml/min)**
- ▶ **IV or IO in burned areas? Get what you can!**
- ▶ **Make sure you don't give cold fluids!**

# **Don't get BURNED by:** **Use of Prehospital IV Fluids**

**But what if they're hypotensive?**

***Increase fluids as needed BUT....***

- ▶ ***LOOK FOR OTHER CAUSES OF SHOCK AS WELL***
- ▶ ***USE MENTAL STATE AS A GUIDE, NOT JUST BP TARGET 90 -100 SYSTOLIC***
- ▶ ***AVOID FLUID OVERLOAD, WATCH FOR THIRD-SPACING, WATCH FOR IV INDUCED HYPOTHERMIA***
- ▶ ***BEWARE OF HIDDEN BLEEDING/TRAUMA***

**DONT JUST REFLEXIVELY RUN FLUIDS WIDE OPEN!**



**Don't get BURNED by:**  
**Hypothermia**

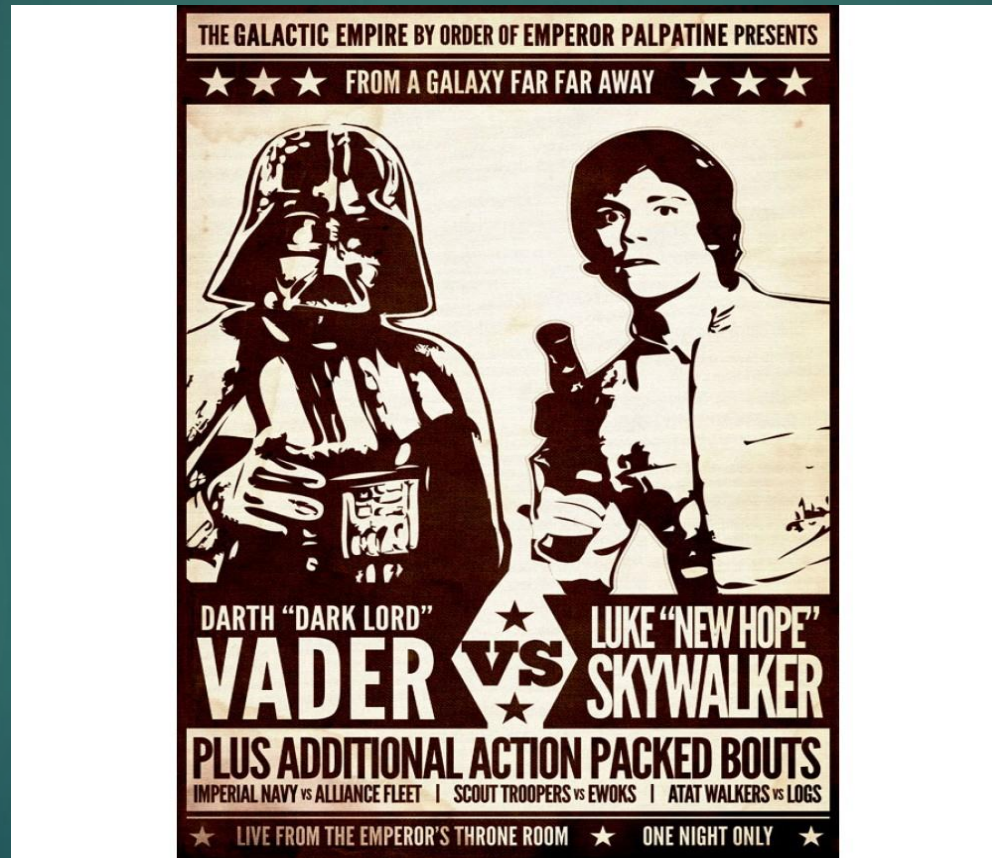
***COOL THE BURN***



***WARM THE PATIENT***

# Don't get **BURNED** by: **Hypothermia**

**WET!**



**DRY!**

***The battle continues!!***

# **Don't get BURNED by: Hypothermia**

## **THE WET GUYS SAY:**

- ▶ **Cools the burn**
- ▶ **Helps relieve pain**
- ▶ **Calms the patient**

**(Lots of research says they're right!)**



# **Don't get BURNED by: Hypothermia**

## **THE DRY GUYS SAY:**

- ▶ **WET Promotes hypothermia**
- ▶ **WET Interferes with coagulation**
- ▶ **WET Interferes with wound healing and promotes infection**
- ▶ **(Lots of research says they're right!)**

# Then there's THESE guys... just to confuse the issue further





***Let's try a little  
experiment.....***





**YOU SATURATED YOUR BURN PATIENT WITH  
SALINE AND DIDN'T WRAP THEM WITH BLANKETS?**

**YOU'RE A SPECIAL KIND  
OF STUPID, AREN'T YOU?**

# The Hibbler Method of Passive External Rewarming

- ▶ Completely open the blanket and drape over the stretcher - moisture resistance layer down, insulating layer up.
- ▶ Place the patient onto the stretcher and wrap them up - snug as a bug in a rug.
- ▶ Limit skin exposure



- ▶ [http://journals.lww.com/ejanaesthesiology/Fulltext/2010/06121/A\\_non\\_evaporati\\_on\\_layer\\_combined\\_with\\_insulation.608.aspx](http://journals.lww.com/ejanaesthesiology/Fulltext/2010/06121/A_non_evaporati_on_layer_combined_with_insulation.608.aspx)
- ▶ <https://www.ncbi.nlm.nih.gov/pubmed/21699720>Limited skin exposure

# **Don't get BURNED by:** **Inadequate Pain Management**

- ▶ Pain and anxiety management are ***essential*** components of burn care
- ▶ Opiates and benzodiazepines
- ▶ IV/IO route preferred
- ▶ No topical analgesics
- ▶ No IM injections directly into burned areas
- ▶ BLS Comfort measures-THEY MATTER!

***<http://www.uptodate.com/contents/emergency-care-of-moderate-and-severe-thermal-burns-in-adults>***



# **Don't get BURNED by: Electrical Burns**

- ▶ **External damage may not seem extensive, BUT.....**
- ▶ **There may be major damage UNDER the skin**
- ▶ **Everything between point A and point B is literally “cooked”**





# **Don't get BURNED by: Electrical Burns**

## **Special Considerations:**

- ▶ **Cardiac dysrhythmias/arrest**
- ▶ **Paralyzed respiratory muscles**
- ▶ **Organ system failure seemingly remote from injury**
- ▶ **Safety concerns**

# **Don't get BURNED by:** **Chemical Burns**

- ▶ **Be suspicious of liquids, powders, vapors at scene**
- ▶ **Beware in industrial settings**
- ▶ **Withdraw if necessary**
- ▶ **Use proper PPE**
- ▶ **Decontaminate immediately**
- ▶ **Use additional resources**



**“SCENE SAFETY-BSI!”**  
**(.....NOT!)**

# Don't get **BURNED** by: Transport Decisions

## **BURN CENTER**

**Most preferred choice for burns w/o other issues**

## **TRAUMA CENTER**

**Burns with major trauma issues**

## **NEAREST 911 ER**

**Unmanageable airways  
Cardiac arrest  
Excessive transport times  
Minor burns not meeting burn center criteria**



# **Don't get BURNED by: Transport Decisions**

***Q: But can't any ER handle burns?***

***A: In the initial stages, YES***

***(NYS Burn Disaster Initiative-2006-Burn supplies to community and non burn center hospitals)***

***Q. So why should I go to a burn center???***

# **Why Burn Centers Benefit Patients**

- ▶ **Your patient has just survived a burn emergency and was transported to the ER. Airway, breathing, circulation supported. Systems monitored. Pain controlled. Dressings in place.**

***NOW WHAT?***

# **Why Burn Centers Benefit Patients**

**Burn centers provide a comprehensive system of post-ER care for the physical and psychological well being of major burn victims.**

**Among the services provided:**

- ▶ **Specialized Burn Surgical Teams with experience in general surgery, plastic surgery, burn surgery, and critical care**
- ▶ **Nurses and respiratory therapists specializing in burn care**

# Why Burn Centers Benefit Patients

- ▶ **Specialized Burn ICU with particular attention to infection control issues**
- ▶ **A full range of rehabilitation specialists, including physical and occupational therapists, social workers, psychological services, pain management specialists**
- ▶ **Centralized services from admission to discharge**

***<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2801053/>***



# Why Burn Centers Benefit Patients









# Links to Articles and Websites on Burn Care

in addition to those listed in the presentation

<http://www.jems.com/articles/print/volume-38/issue-12/features/basics-burn-management.html>

<http://www.dallasnews.com/news/crime/headlines/20160710-gov.-greg-abbott-in-severe-pain-from-burns-as-he-traveled-to-dallas-in-shooting-aftermath.ece>

<http://www.jems.com/articles/print/volume-41/issue-8/departments-columns/case-study/water-jel-provides-alternatives-to-burn-cooling.html>

<http://www.jems.com/articles/print/volume-41/issue-8/departments-columns/case-study/water-jel-provides-alternatives-to-burn-cooling.html>



<http://www.medscape.com/viewarticle/711438>

<https://www.vicburns.org.au/initial-management/secondary-survey/secondary-survey-and-immediate-management/prevent-hypothermia.html>

<http://www.jems.com/articles/print/volume-40/issue-4/feature/scorched-skin-a-guide-to-prehospital-burn-management.html>

<http://www.surgicalcriticalcare.net/guidelines/Acute%20Burn%20Resuscitation>

[http://www.usaisr.amedd.army.mil/cpgsBurn\\_Care\\_11May2016.pdf](http://www.usaisr.amedd.army.mil/cpgsBurn_Care_11May2016.pdf)

<http://www.ameriburn.org/ablscoursedescriptions.php>

<http://www.emsworld.com/article/10324947/burn-care-in-ems>



**DEMAND  
EVIDENCE  
AND  
THINK  
CRITICALLY**