



Pediatric Assessment

Presented by:

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Pulse Check Pre-Conference

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Pediatric Resuscitation



Disclaimer, Brief Bio

This presenter has no financial interest in any topic being covered in this presentation, nor is her receiving any compensation from any party not affiliated with this conference.



Fire Service since 2001, EMS since 2003. Paramedic in 2006. CCEMT-P in 2008. CIC in 2014. Tactical Medic in 2014. 10 years as an EMS supervisor.



Currently employed as a Quality Assurance Analyst and Clinical Educator for MultiMed Billing and as a Fly-Car Paramedic and Tactical Medic for Wayne County Advanced Life Support. Also an instructor for EMS Plumblne.





“Being a Dad is my
most important job...”

- Mark Dominik

Facts and Stats

- Children fare worse than adults in the out-of-hospital phase of resuscitation
- 70% of all pediatric trauma deaths occur in the field
- Survival rate for out-of-hospital cardiac arrest is half that of adults
- Failure rate for resuscitative interventions in field is 2x that of adults
- Failure rates for prehospital ET intubation for injured children is near 50%





Think...

- When was the last time you had a pediatric patient?
- When was the last time you had a critical pediatric patient?
- When was the last time you had to resuscitate a pediatric patient?

Facts and Stats



Injury: leading cause of death 1-14

8% of kids die prior to EMS arrival

10% of all calls for kids

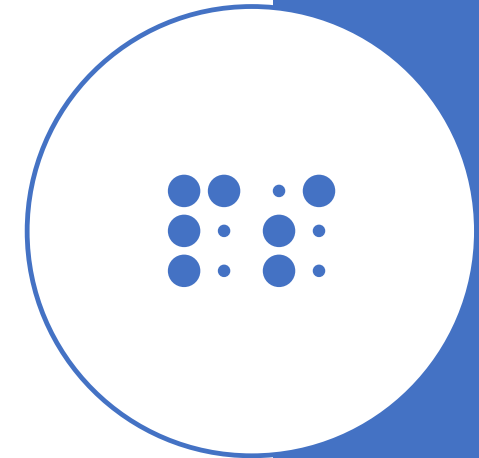
Optimal pre-hospital management is of major importance to reduce M & M

Most common errors in peds management:

- **Failure to manage the Airway**
- **Failure to provide fluid resuscitation**
- **Failure to recognize and treat internal bleeding**

Overview

- Trauma is leading cause of death and disability in children
- Blunt injury represents 80-90%
- Penetrating injury less common



Mechanism of Injury

- Most common for peds:
 - Falls
 - MVCs
 - Car –vs- ped
 - Drownings and near-drownings
 - Burns
 - Physical abuse



Concerns Due to MOI



Shock



Musculoskeletal Injuries



Blunt Trauma



Burns

Thermal
Electrical
Chemical



Peds vs. Auto

Single Injury

- Lower extremity

Multiple Injury

- Head / neck
- Internal chest / abdomen
- Lower extremity fractures

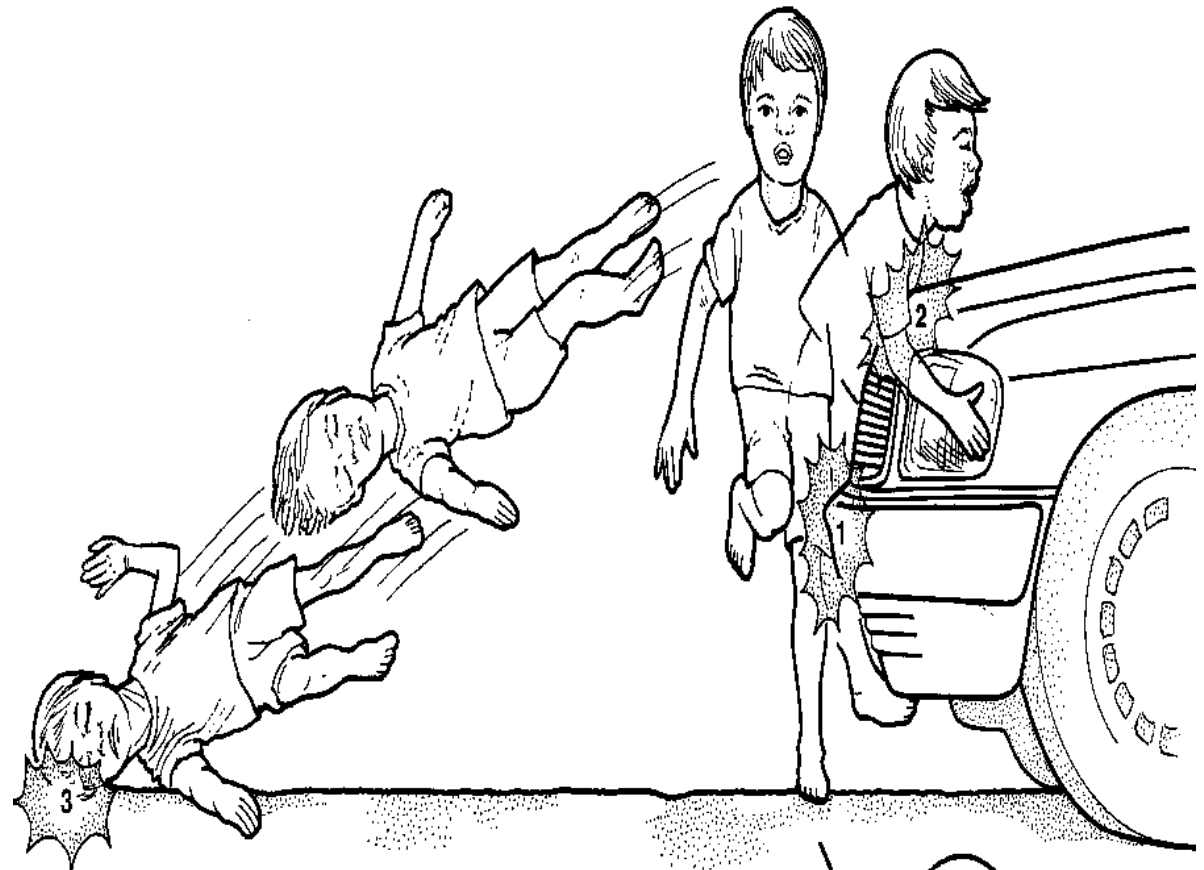


Figure 14: Pedestrian Struck

Typical pattern of injuries affecting upper leg (1), chest/abdomen (2), and head (3)



Blunt Trauma



Number one cause of death in infants and children

50 % of pediatric deaths occur within the first hour

Most injuries result from blunt trauma

Higher incidence of penetrating injuries in urban areas

Thinner body walls allow greater energy transfer

Falls

Low height

Upper extremity fracture

Medium height

Head/neck injury

Face/scalp injury

Upper extremity fracture





Falls

High height

- Head / neck injury
- Scalp / facial laceration
- Internal chest / abdominal injury
- Upper / lower extremity fracture



Bicycle Injuries

Helmeted

- Upper extremity fractures

Unhelmeted

- Head/neck injuries
- Scalp/facial lacerations
- Upper extremity fractures

Handlebar

- Internal abdominal injury





Motor Vehicle Crashes



Occupant

Restrained

- Internal abdominal Injuries
- Lower spine fractures
 - Especially if restraints are not size appropriate

Unrestrained

- Head/neck injuries
- Scalp/facial lacerations



Spinal Injuries



Specific Injuries: Head



Head and brain

- Involved in 60% of blunt injuries
- Head, face and neck
 - Head injuries: #1 cause of trauma death in peds
 - Soft skull
 - 60-70% of pediatric cervical fractures occur at C1-C3







Head and
Neck Injuries



Concussion

Mechanics: direct blow to head/face/neck or indirect force transmission (body blow)

Timecourse: rapid onset, short-lived impairment, spontaneous resolution

Pathophysiology: function > structure

Symptoms: graded syndromes, may or may not include LOC, sequential resolution

Post-Concussion Symptom Scale

- Headache
- Nausea
- Vomiting
- Balance problems
- Dizziness
- Fatigue
- Trouble falling asleep
- Sleeping more than usual
- Sleeping less than usual
- Drowsiness
- Sensitivity to light
- Sensitivity to noise
- Irritability
- Sadness
- Nervousness
- Feeling more emotional
- Numbness or tingling
- Feeling slowed down
- Feeling mentally “foggy”
- Difficulty concentrating
- Difficulty remembering
- Visual problems

Clinical Signs of Concussion



Consciousness (LOC) – not required



Memory – post-traumatic/retrograde amnesia



Cognition



Neurological (physical)



Personality (emotional)

Specific
Injuries:
Chest

Softer, more flexible ribs

Soft, pliant airways

Greater mobility of
heart and great vessels

Specific Injuries: Abdomen



Small abdominal cavity size concentrates injury forces



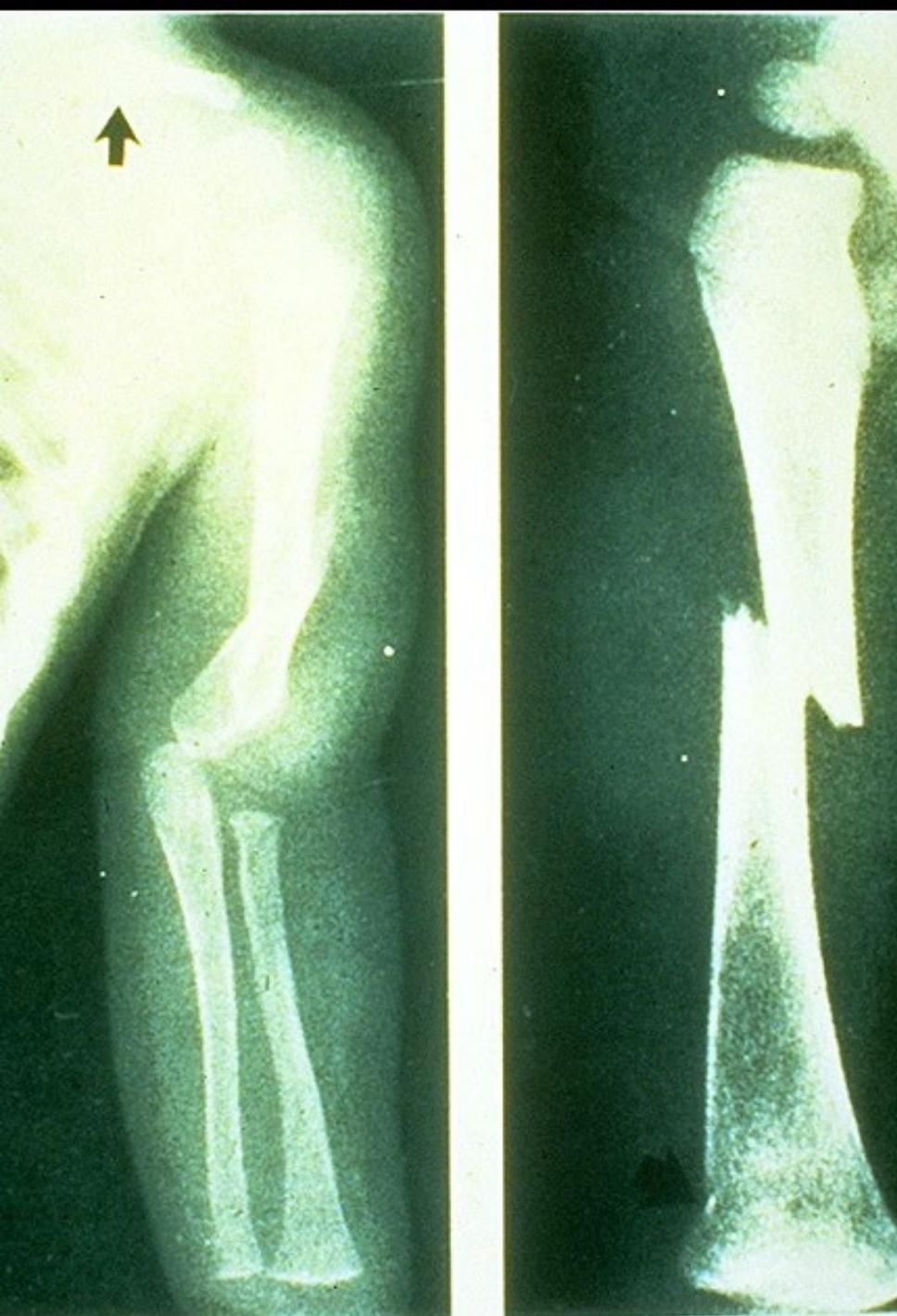
Softer, more flexible ribs allow upper abdominal organs to be injured



Thinner muscles of abdominal wall transmit injury forces directly to internal organs



Internal organs- Involved in 10% of blunt injuries

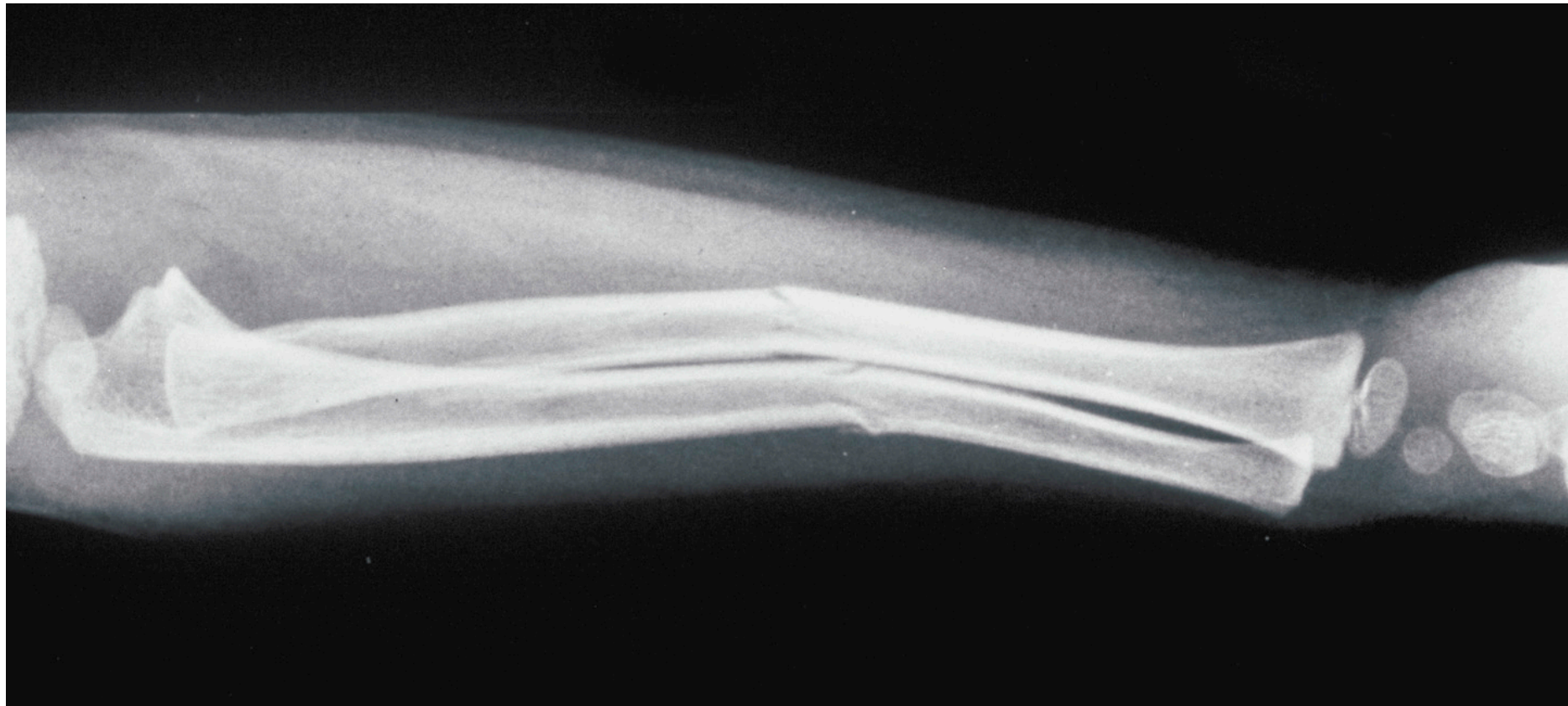


Musculoskeletal Injuries

- Connective tissues are stronger than bones
 - Fractures at growing ends more common
- Softer bones
 - Greenstick fractures
- Force required to cause a clean break is significant and cause for concern



Greenstick Fracture



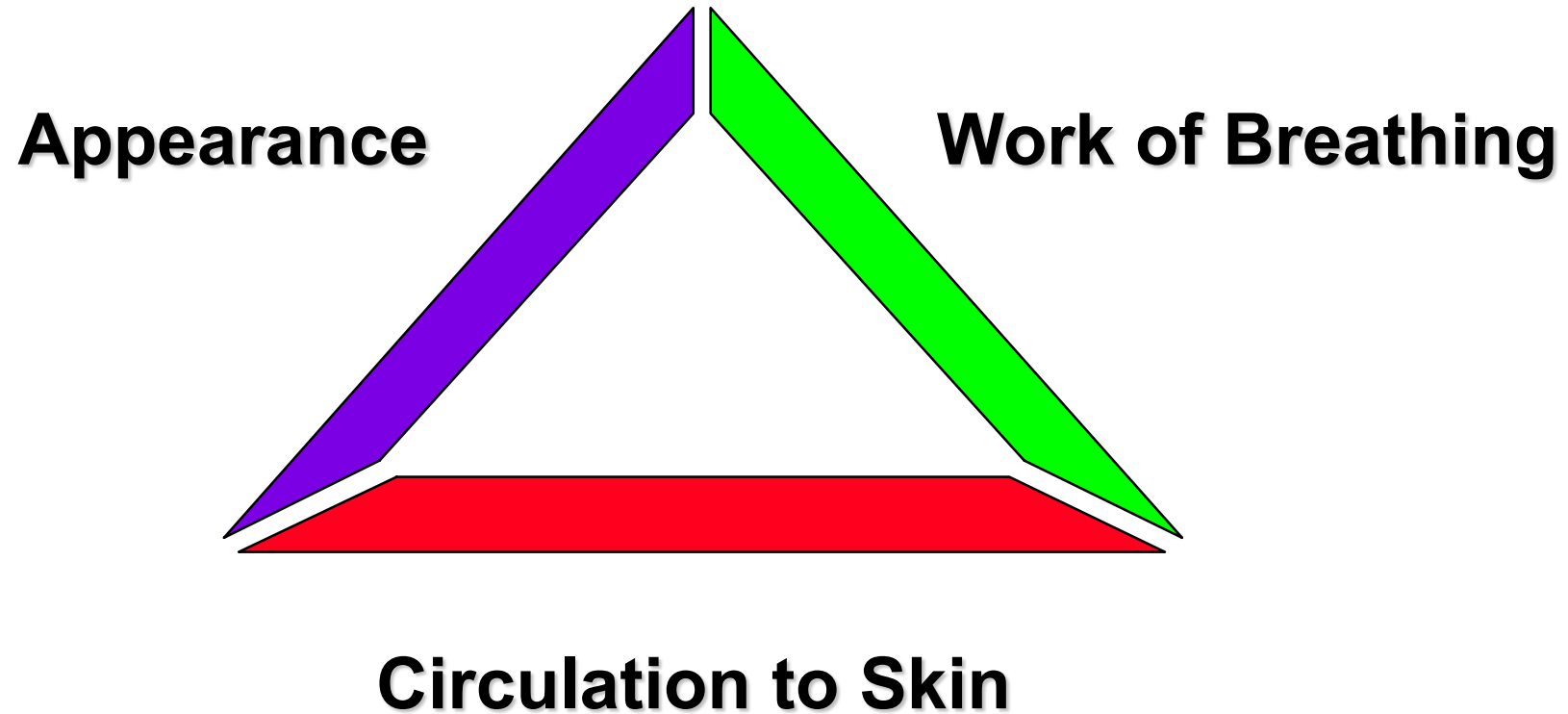
Forearm Fracture





Give Comfort – Give
Pain Meds

Pediatric Assessment Triangle



A man with dark hair, wearing a dark suit jacket, a light blue dress shirt, and a dark tie, is speaking in a classroom. He is gesturing with his right hand. The background shows rows of wooden desks with papers on them, typical of a lecture hall or classroom.

**Boys, you must strive to find
your own voice.**

First Impressions

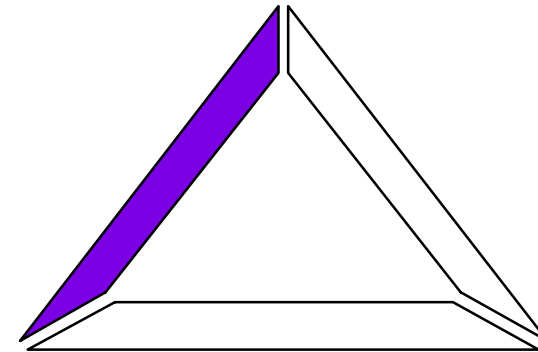


- “Across the room” assessment
- Pediatric assessment triangle
 - *Unstable vs stable
 - * Sick vs not sick
 - *Urgent vs non-urgent



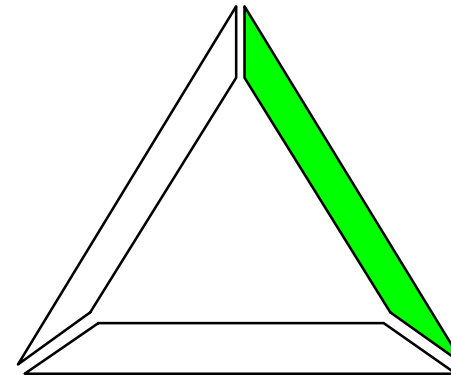
PAT - Appearance

- TICLS.....pronounced Tickle
- Tone
- Interactivity
- Consolability
- Look
- Speech



PAT - Breathing

- Body Position
- Visible movement of chest and abdomen
- Respiratory rate and effort
- Audible airway sounds



Assessment: Breathing

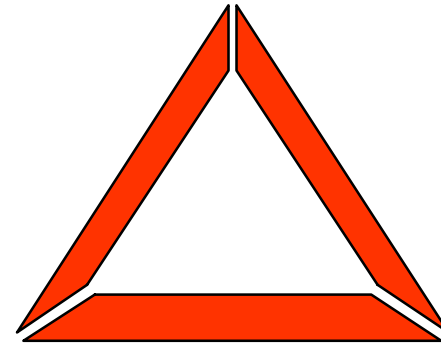
- Increased rate and effort
- Ensure oxygenation and ventilation
- Hypoxia can cause hypoperfusion
- Chest trauma can cause obstructive shock
- Treat any cause of respiratory distress





PAT - Circulation

- Skin Temperature
- Pulse strength
- Capillary refill time





Primary Survey



- Assessment and management occur simultaneously
- Determine any life-threatening conditions

Primary Survey

A – Airway

B –
Breathing

C –
Circulation

D – Da
Brain

E –
Exposure

Any Airway Red Flags?

Vocalization

Drooling

Abnormal airway sounds

Preferred posture

Tongue obstruction

Loose teeth or foreign objects

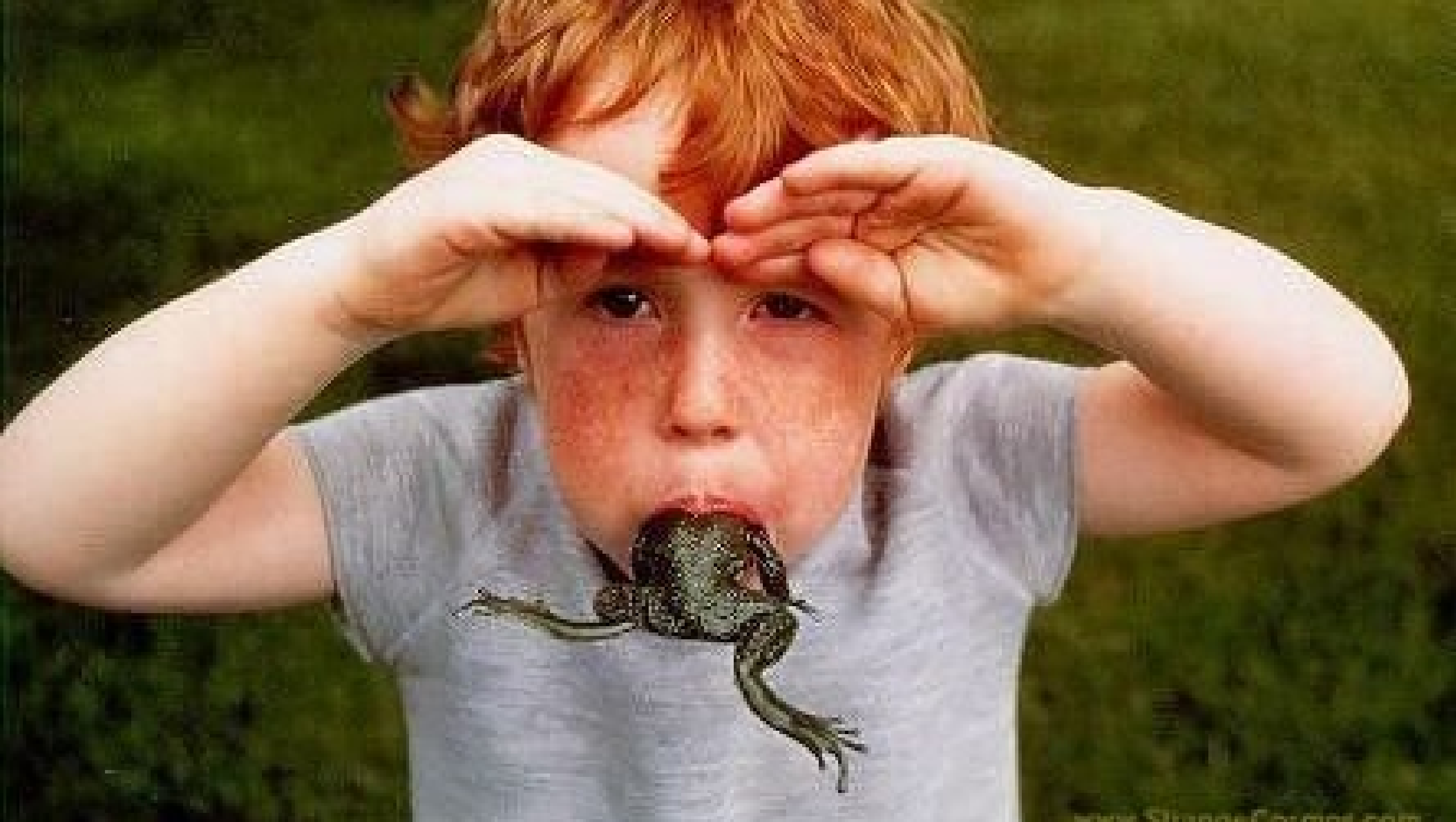
Bleeding/vomitus

AAAAAAND.....

What's green with red?

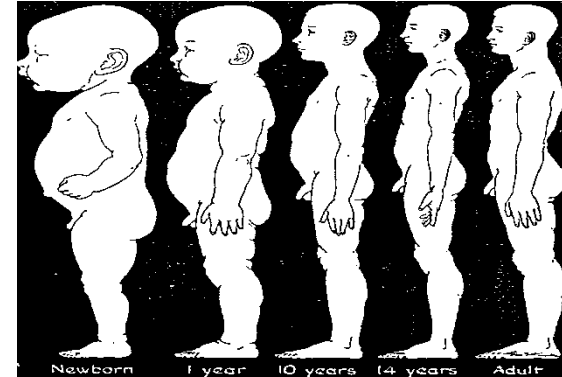
A very rare airway obstruction....

Or so I've been told.



Initial Assessment: Airway

- Patent and maintainable?
 - Position
 - Occipital region until 4 years
 - Neutral in-line position
 - Suction
 - Infants < 6 months are nose-breathers
 - Suctioning nasopharynx improves breathing significantly
 - Small enough catheter
 - Do not insert too deeply
 - As briefly as possible
 - Airway adjuncts
 - OPA
 - NPA





Any Breathing Red Flags?

- Level of consciousness
- Rate and depth of respirations
- Breath sounds
- Symmetric chest rise and fall
- Work of breathing
 - Nasal flaring
Head bobbing
 - Retractions
Grunting
 - Accessory muscle use



Any Circulation Red Flags?

Central and peripheral pulse rate and quality

Skin color, temperature, and moisture

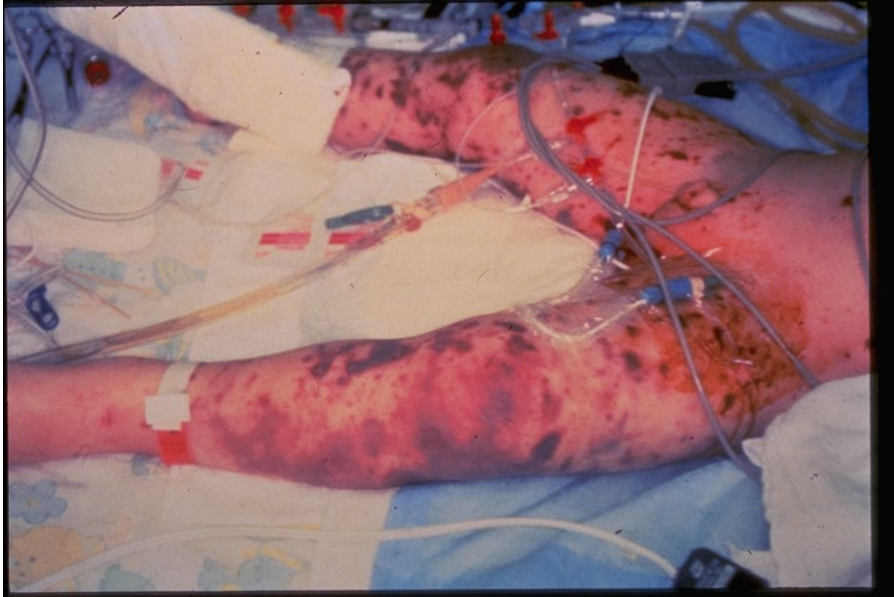
(most reliable indicator of perfusion)

Capillary refill <2

Mental status

External bleeding





Hypoperfusion



Second major cause of pediatric cardiopulmonary arrest



Unusual because of efficient pediatric vessel constriction



Fast decompensation

Causes

Heat loss
(newborns,
neonates)

Dehydration

Infection, sepsis,
anaphylaxis

Trauma

Blood loss

EMS care focuses
on suspecting
shock before it
develop

Bleeding and Shock

The total blood volume is smaller (80 mL/kg)

- 1 y/o ~ 10 kg: Blood volume 800 mL = 27 oz = 2 cans of soda
- 6 y/o ~ 20 kg: Blood volume 1,600 mL = 54 oz = 4.5 cans of soda

Child's loss is proportionally greater

Compensated Shock



Irritability or anxiety



Tachycardia



Tachypnea



Weak peripheral pulses, full central pulses



Delayed capillary refill (>2 sec in <6 y/o)



Cool, pale extremities



Systolic BP within normal limits



Decreased urinary output



LETHARGY OR COMA



MARKED
TACHYCARDIA OR
BRADYCARDIA



ABSENT PERIPHERAL
PULSES, WEAK
CENTRAL PULSES



MARKEDLY DELAYED
CAPILLARY REFILL



COOL, PALE, DUSKY,
MOTTLED
EXTREMITIES



HYPOTENSION



MARKEDLY
DECREASED
URINARY OUTPUT



ABSENCE OF TEARS



Decompensated Shock

Reminder..... First Impressions



Ill-appearing children are in decompensated shock



Compensated shock presents with more subtle findings

Assessment: Mental Status

Key indicator of perfusion



Treatment Plan



HIGH FLOW O₂



AGGRESSIVE
AIRWAY/VENTILATION
MANAGEMENT



VOLUME REPLACEMENT
(20 ML/KG BOLUSES)



RAPID TRANSPORT TO
DEFINITIVE CARE

Secondary Survey

F – Full set of vitals
and family

G – Give comfort

H – Head to toe and
history

I – Inspect

“It ain’t over until the
patient is over”





Memorize their vitals.



Transport Decision

- All patients with shock require immediate transport
 - Further Assessment enroute
 - Continue treatments



Immobilization and Transport

- Immobilize small children
 - C-collar
 - Layer of padding
 - KED
 - Other devices
- Keep warm
 - Blankets
 - Head coverings
 - Cold weather
 - Near drowning



How's the pediatric patient doing who swallowed 10 quarters last night?

No change yet...



Summary



Maintain Airway, Breathing, and C-spine control



Give high-flow, high concentration O₂



Assist ventilations if child demonstrates altered mental status or respiratory distress

Summary

Consider	Consider length-based resuscitation tape
Immobilize	Immobilize as appropriate
Transport	Transport to pediatric tertiary care if possible
Keep	Keep the child warm





Additions /
Clarifications?

Inside YOU is untapped potential



Thank You!!!



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