

“Early Show” Top Ten Pearls of Pediatric Trauma

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I have no financial disclosures.

Objectives: Pediatric Trauma Nuances



Anatomy



Injury Patterns



Evaluation



Management

Background



Trauma:

#1 Cause Death & Disability in Children

Mechanism of Injury

Age 0-9: Falls

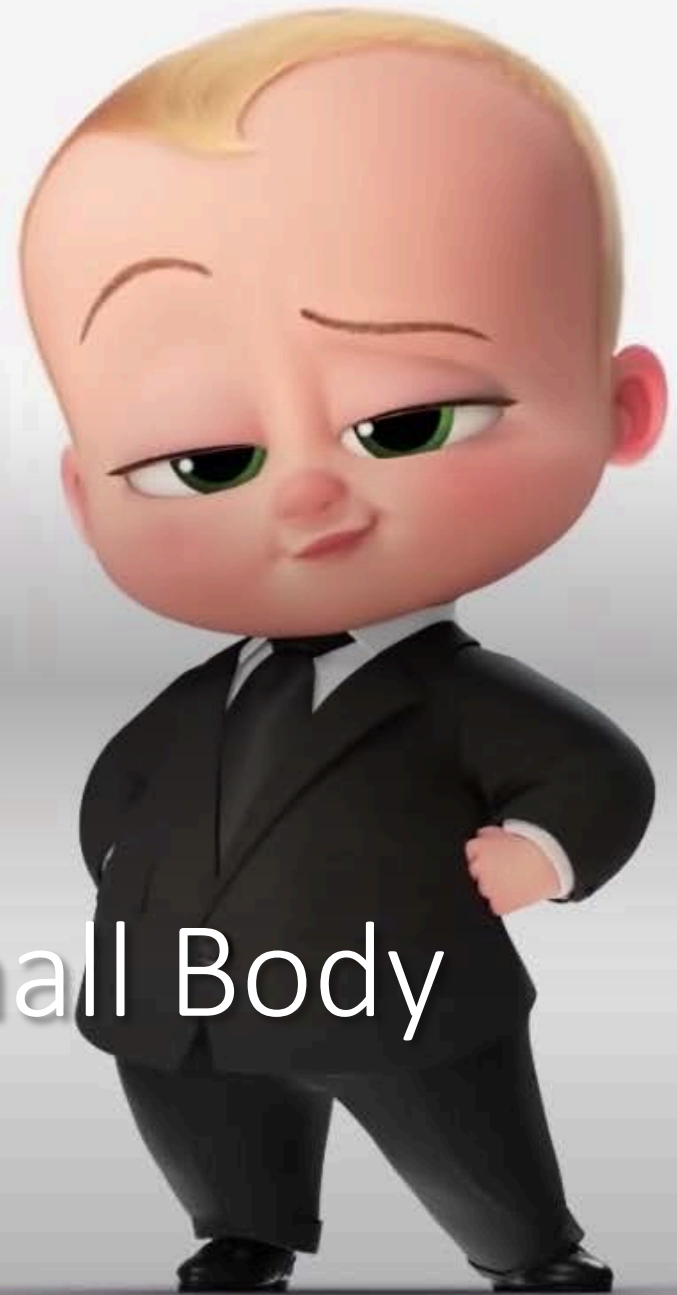
Age 10-18: MVC



Not Just Small Adults

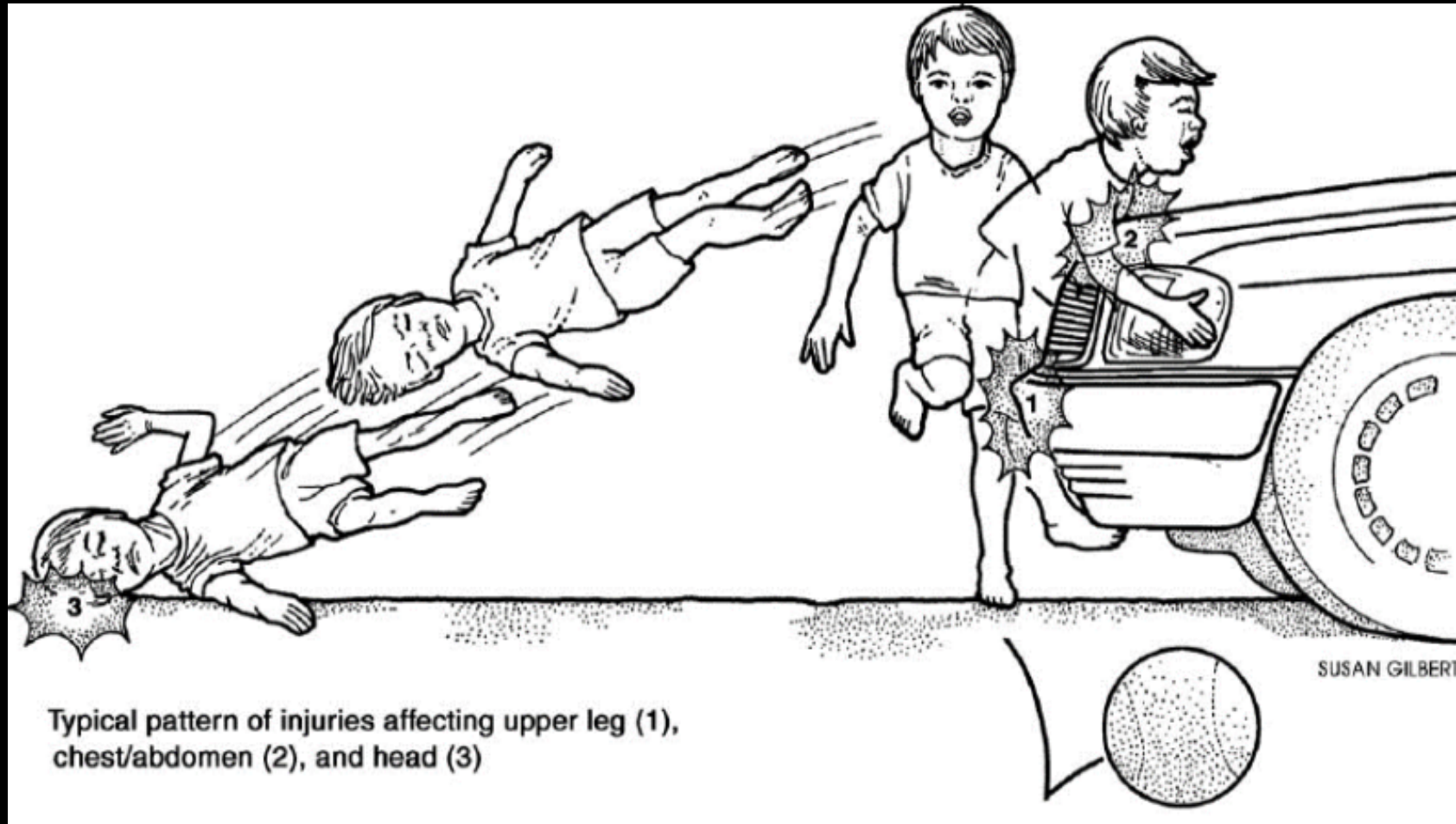
Top Ten





#1: Big Heads, Small Body

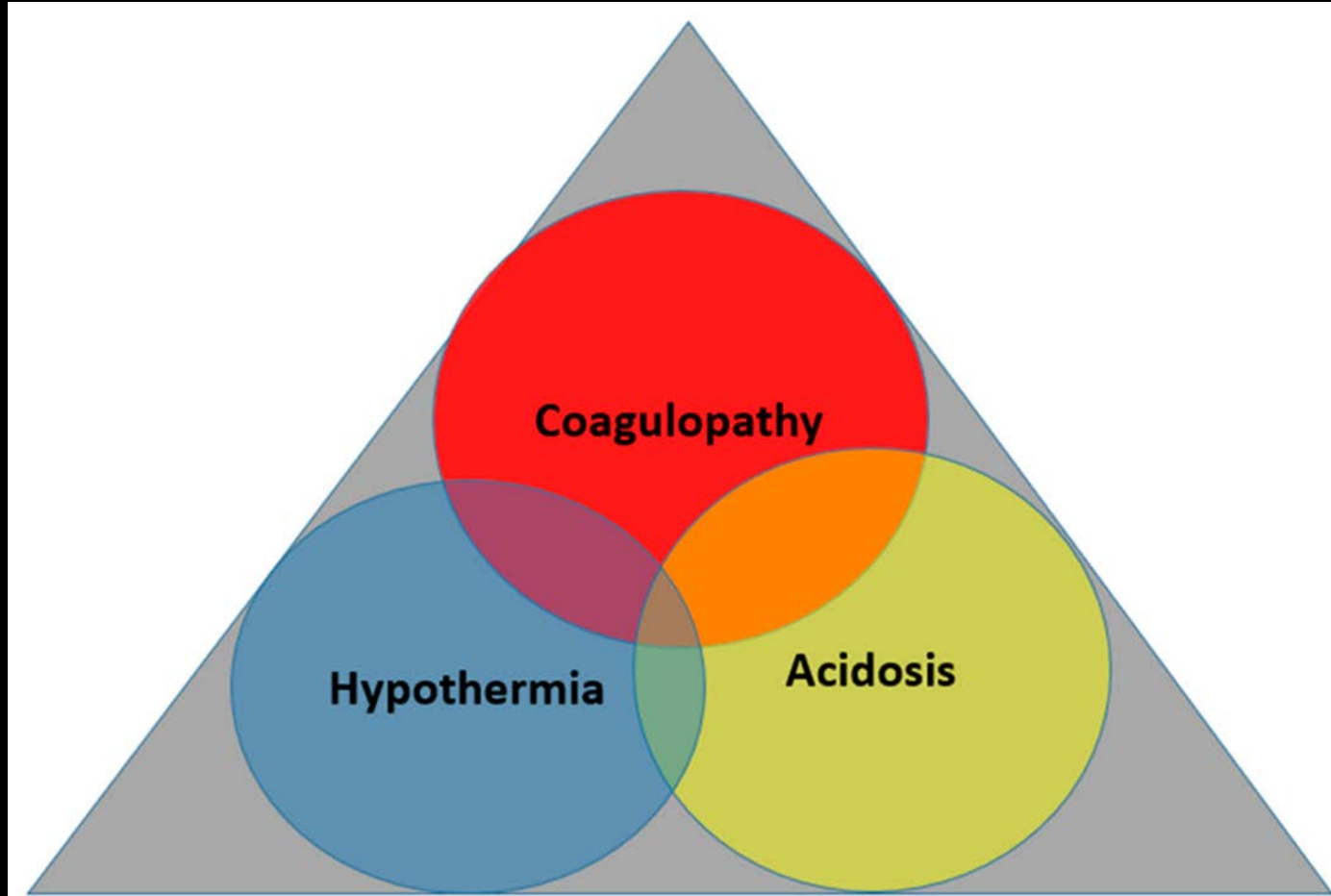
Injury Pattern: Waddell's Triad



A photograph of a patient lying in a hospital bed, receiving medical attention. A healthcare professional is holding a syringe and injecting a substance into the patient's arm. The patient is wearing a white hospital gown and has a white bandage on their arm. The patient's face is partially visible, showing their eyes and nose. The background is slightly blurred, showing other people in the room. The text "#2: Large % of Surface Area" is overlaid on the image in white font.

#2: Large % of Surface Area

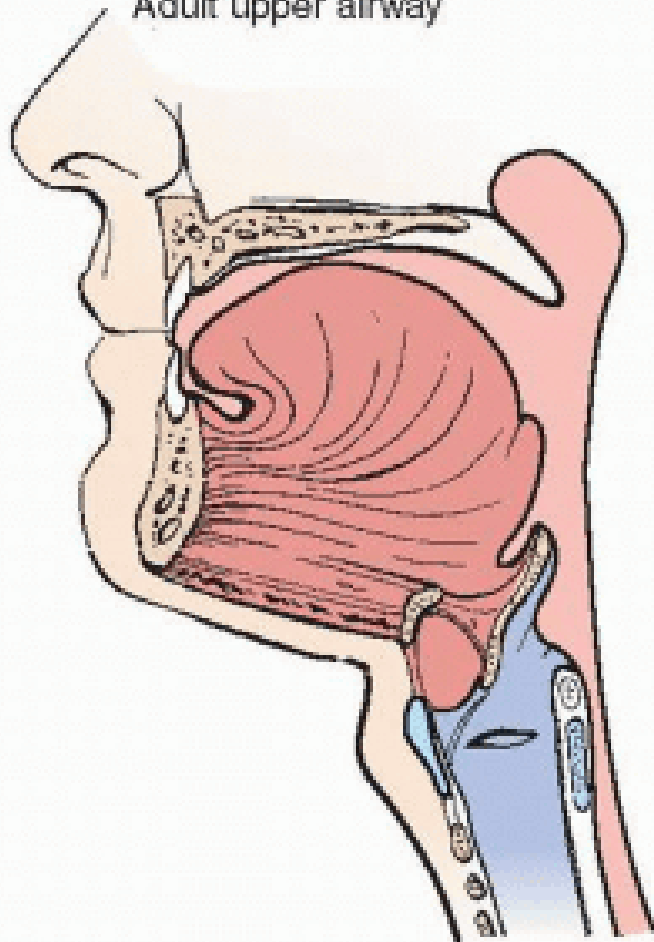
Triad of Death



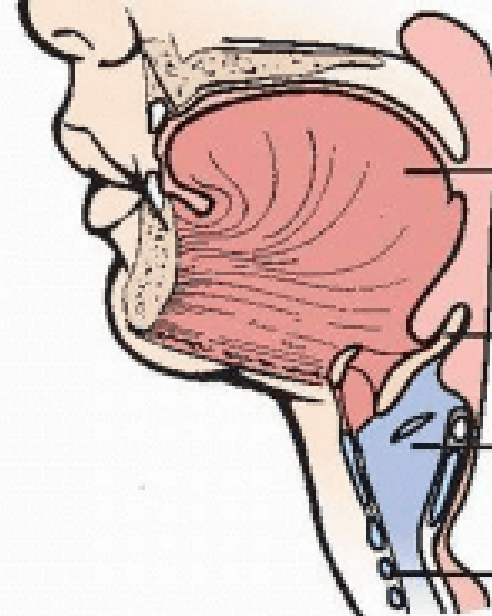
A close-up photograph of a baby's face, looking upwards with a wide, open-mouthed expression. The baby has light skin and blue eyes. The background is a white fabric with a delicate floral pattern in shades of pink, orange, and green. The overall lighting is soft and natural.

#3: Airway Differences

Adult upper airway



Pediatric upper airway



Larger tongue in proportion to mouth

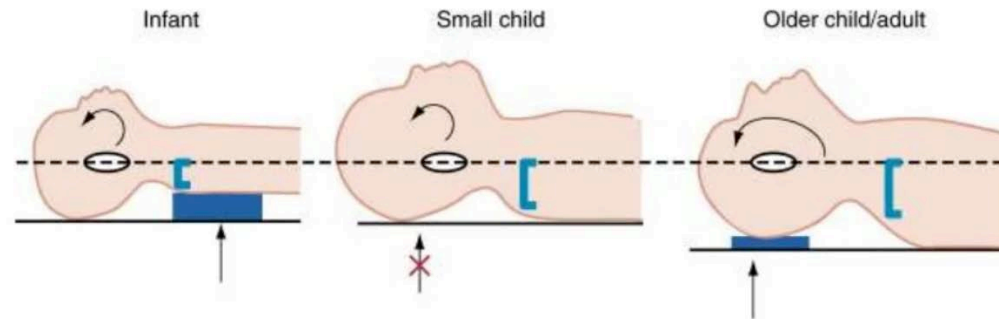
Larger and floppier epiglottis

Larynx is more anterior and superior

Trachea is narrow and less rigid

Head Positioning

Sniffing Position or “Ear to Sternal Notch”



Intubation





A photograph of a baby lying on their back on a light-colored wooden floor. The baby has reddish hair and is wearing a white long-sleeved shirt and grey pants. A hand is visible on the left side of the frame, resting on the baby's back. The background is a plain, light-colored wall. The image has a semi-transparent dark overlay.

#4: Head Trauma Common

#1 Cause Death



PECARN HEAD TRAUMA DECISION GUIDE:

TO CT OR NOT

PECARN

Pediatric Head CT Rule

PECARN

Pediatric Head CT Rule

4.4% ciTBI

younger
than 2 years

AMS
or
GCS < 15
or
Palpable skull fx

CT Head Recommended

NONE

LOC > 5 sec
or
Non-frontal hematoma
or
Not acting normally
or
Severe mechanism*

Observation vs. CT Head

NONE

No CT Required!

Discharge

0.9% ciTBI

2 years
or older

AMS
or
GCS < 15
or
Signs of basilar skull fx

CT Head Recommended

NONE

History of LOC
or
History of vomiting
or
Severe headache
or
Severe mechanism*

Observation vs. CT Head

NONE

No CT Required!

Discharge

4.3% ciTBI

0.8% ciTBI

< 0.02% ciTBI

< 0.05% ciTBI

*SEVERE MECHANISMS

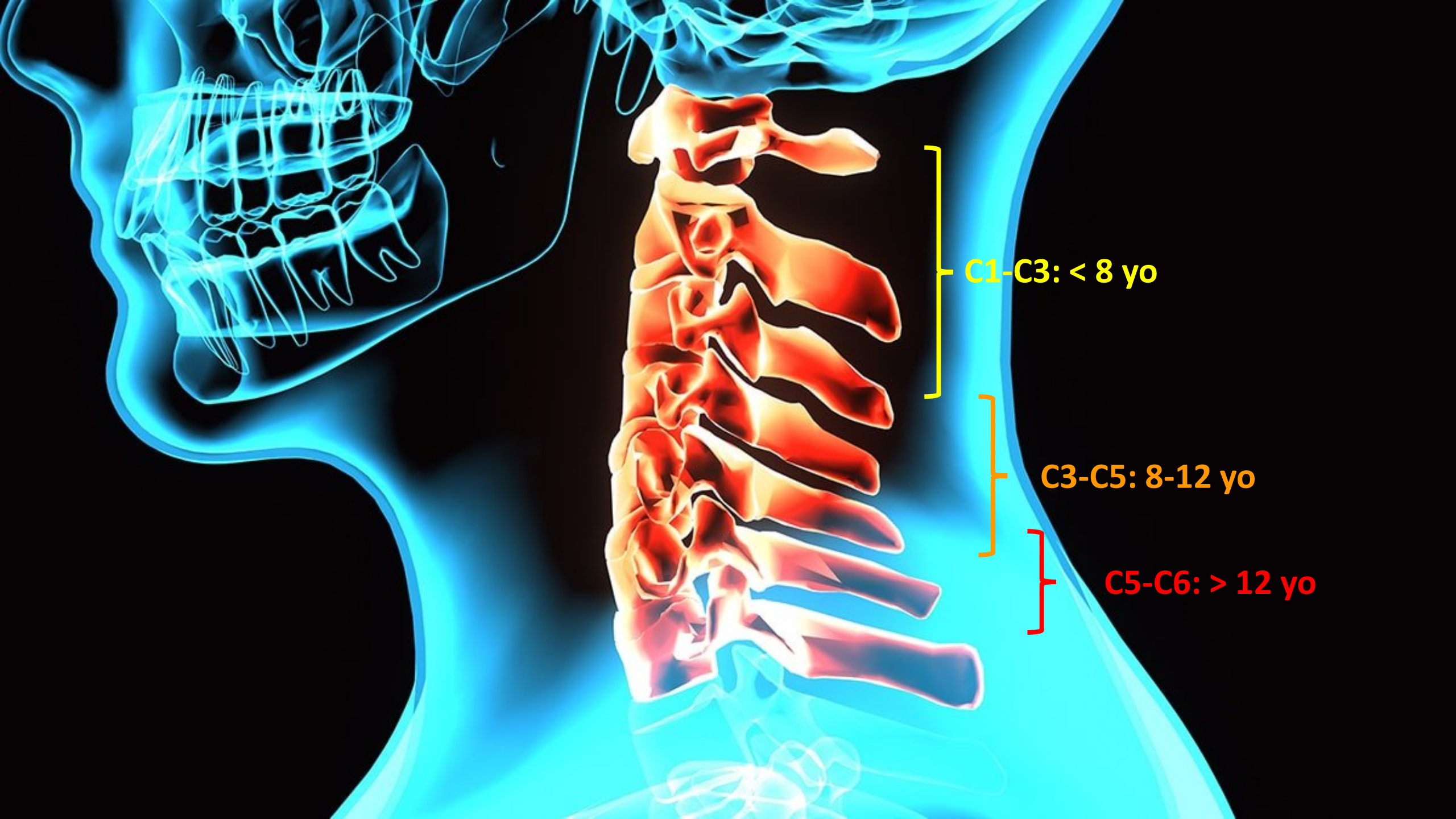


*SEVERE MECHANISMS





#5: Cervical Spine Injuries Uncommon



C1-C3: < 8 yo

C3-C5: 8-12 yo

C5-C6: > 12 yo

Imaging Criteria

NEXUS

Validated by Vicellio


Hoffman et al. 2000

Prospective
<18yrs
3065 participants

Low risk for C spine injury with all of ...

- Absence of posterior midline cervical spine tenderness
- Absence of a neurological deficit.
- Absence of intoxication
- Normal level of alertness
- Absence of distracting pain

Sensitivity 100%
Specificity 19.9%

 Cannot be applied reliably to children <9yrs

PECARN


Leonard et al. 2010

Prospective
<18yrs
4091 participants

Any one of the following factors is associated with CSI in children...

- Altered Mental Status
- Focal Neurological Findings
- Report of neck pain
- Reported decreased neck mobility or on physical examination
- High risk MVC
- Significant torso injury
- Diving as the mechanism
- Predisposing factors such as T21

Sensitivity 90.5%
Specificity 45.6%

 Underpowered to establish definitive rule



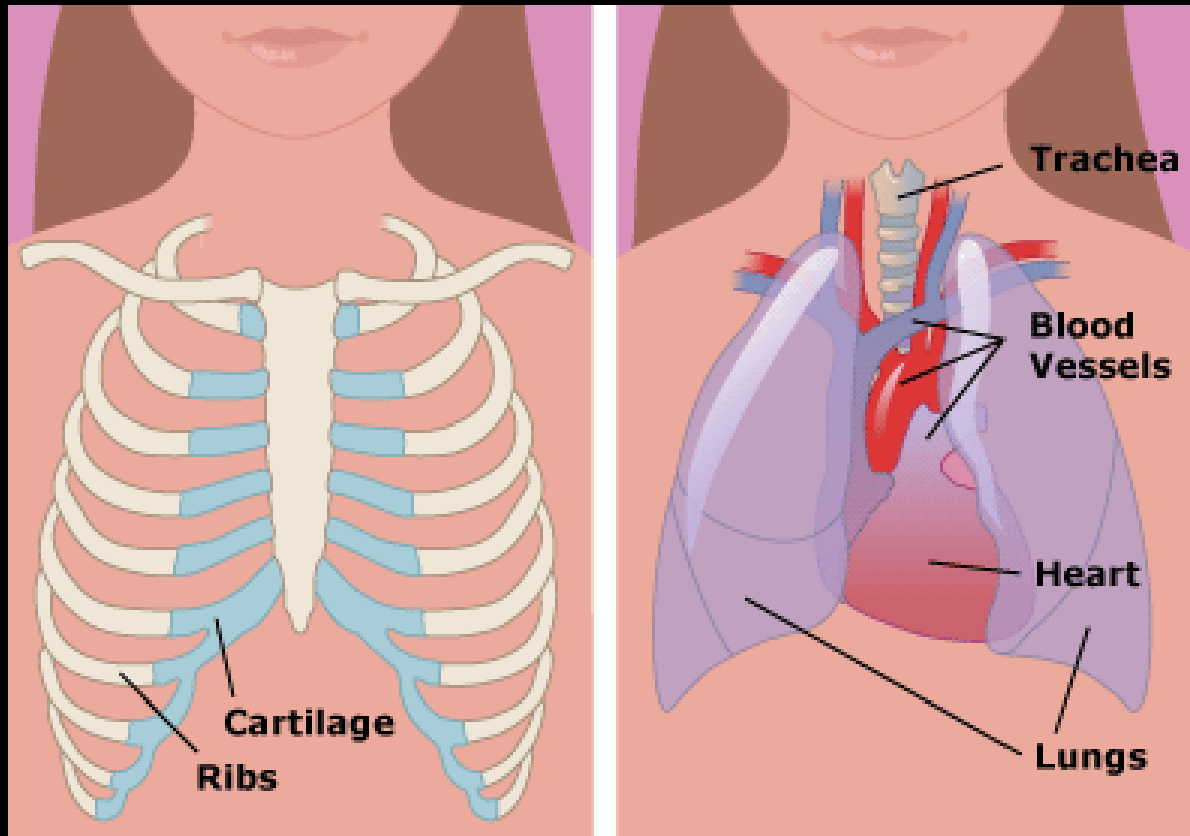
SCIWORA (Spinal Cord Injury Without Radiological Abnormalities)

**Spinal
Cord Injury**

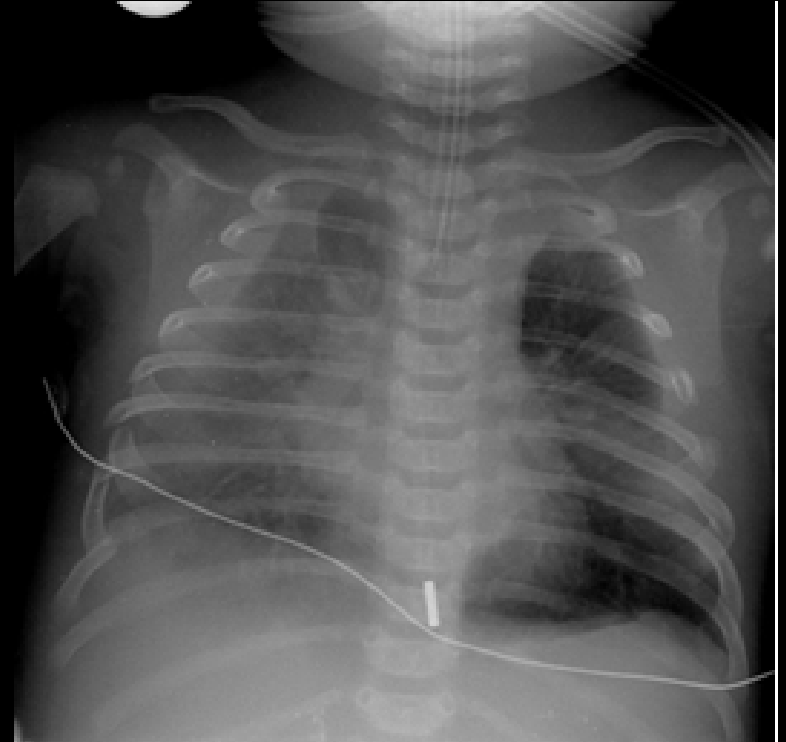


A young boy with short brown hair is wearing dark sunglasses and a tan, segmented chest protector. He is looking slightly to the right of the camera with a neutral expression. The background is a plain, light-colored wall.

#6: Chest Trauma is RARE



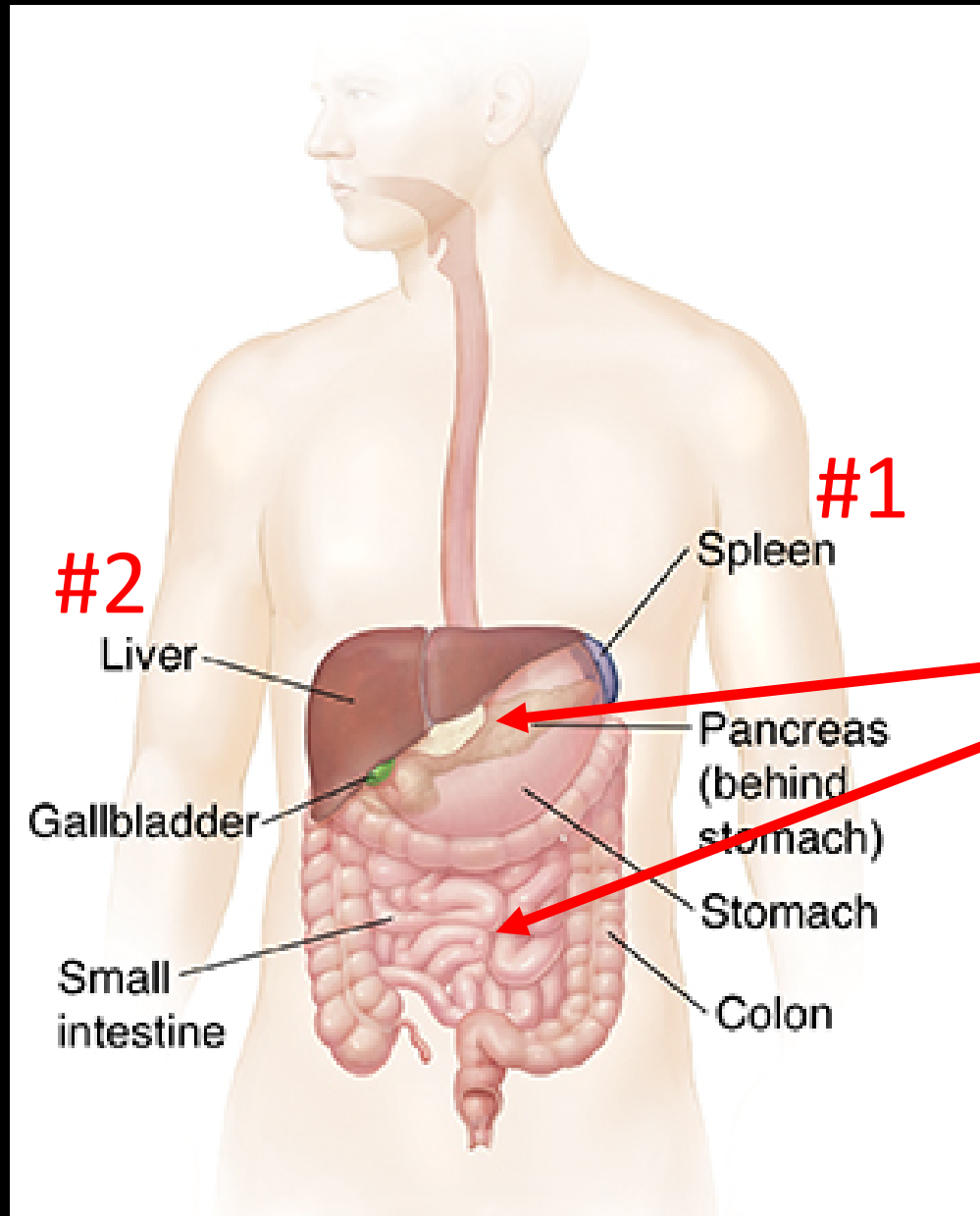
Imaging



<https://www.rch.org.au/trauma-service/manual/chest-injury/>

A photograph of a person's torso from the chest down to the waist. They are wearing a light blue t-shirt. Their hands are placed over their abdomen, with fingers spread, suggesting a protective gesture or a sign of abdominal pain or trauma. The background is a plain, light gray color.

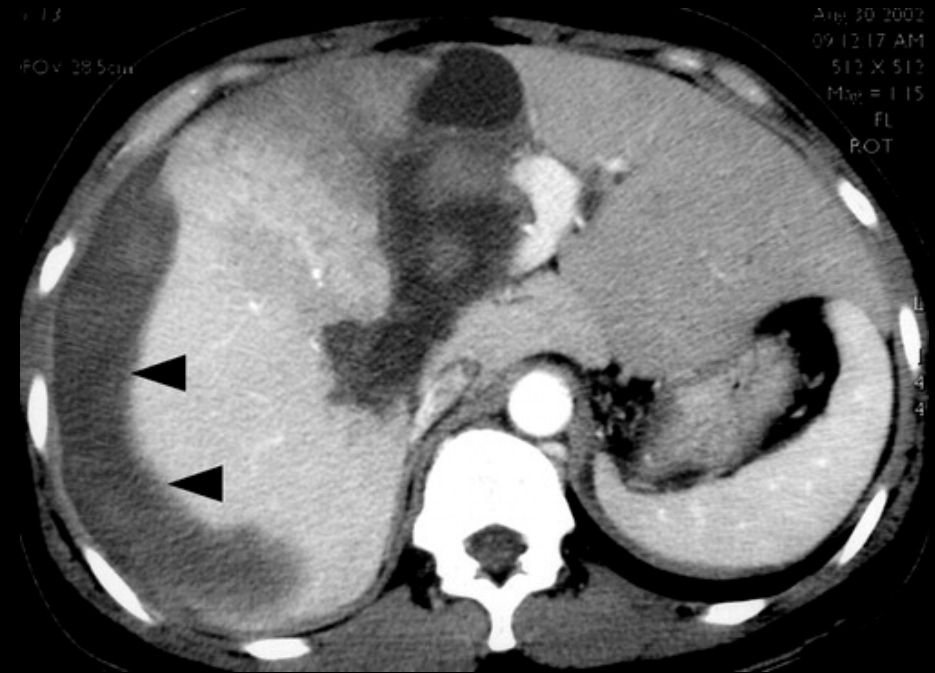
#7: Abdominal Trauma Patterns



Imaging



EFAST



CT



#8: Keep Normotensive!

Permissive expansion



$$\text{Low SBP (5\%)} = 70 + (\text{Age} \times 2)$$

A microscopic view of numerous red blood cells (erythrocytes) in a fluid medium. The cells are biconcave discs, appearing as reddish-orange, slightly flattened spheres with a darker center. They are scattered throughout the frame, with some in sharp focus and others blurred in the background, creating a sense of depth. The overall color palette is dominated by warm reds and oranges against a dark, almost black background.

#9: Blood Transfusions

PRBC 10mL/kg

Massive Transfusion Protocol

40mL/kg of *Any* Blood Product in first 24 hours

PRBCs : Plasma : Platelets

1:1:1

TEG



#10: Child Life



Summary

- #1: Big Heads, Small Body
- #2: Large % of Surface Area
- #3: Airway Differences
- #4: Head Trauma Common
- #5: Cervical Spine Injuries Uncommon
- #6: Chest Trauma is RARE
- #7: Abdominal Trauma Patterns
- #8: Keep Normotensive!
- #9: Blood Transfusions: 10mL/kg
- #10: Use Child Life



Thank you!
