# Approach to the Pediatric Patient

## “Children are NOT miniature adults”

Neils Giddins MD
University of Vermont Children’s Hospital
Burlington, Vermont , USA

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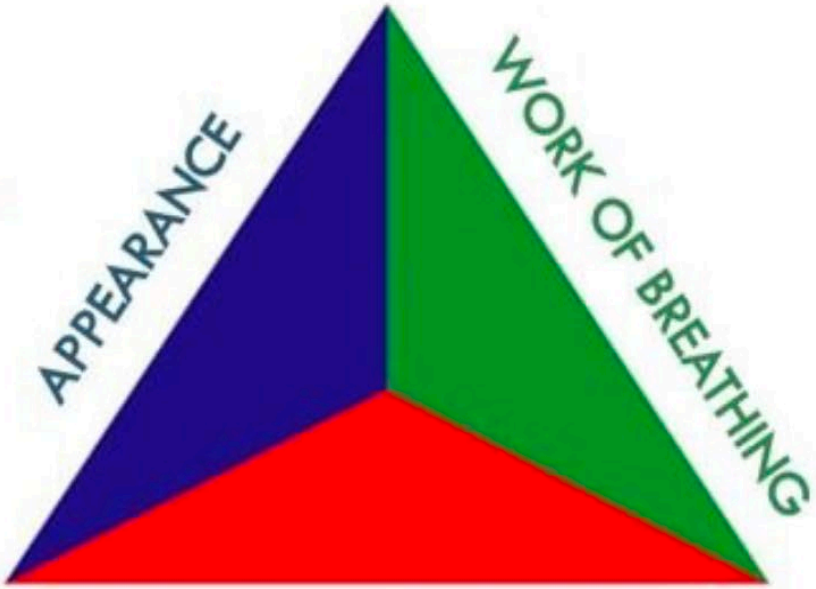
# Pediatric Assessment Triangle




Tone
Interactiveness
Consolability
Look/Gaze
Speech

Breath Sounds
Positioning
Retractions
Flaring
Apnea/Gasping

Pallor
Mottling
Cyanosis

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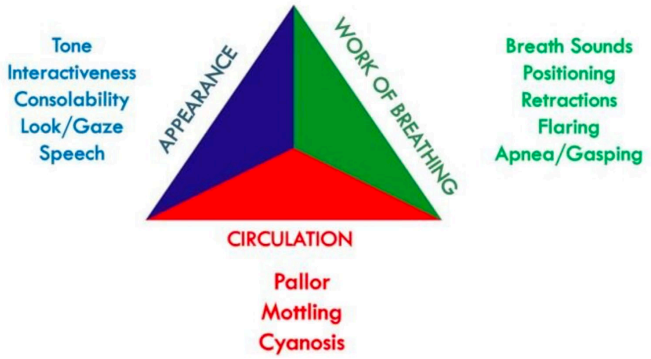
# Work of Breathing

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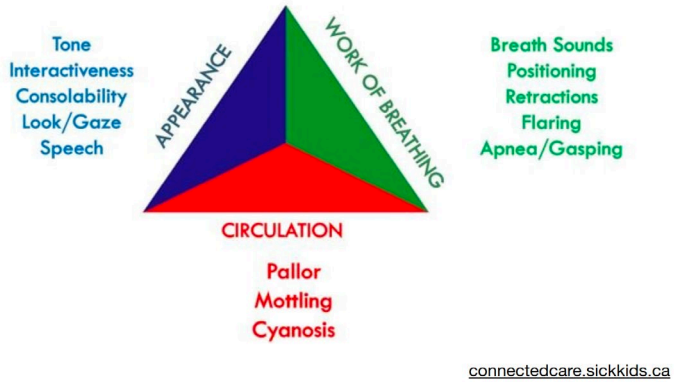
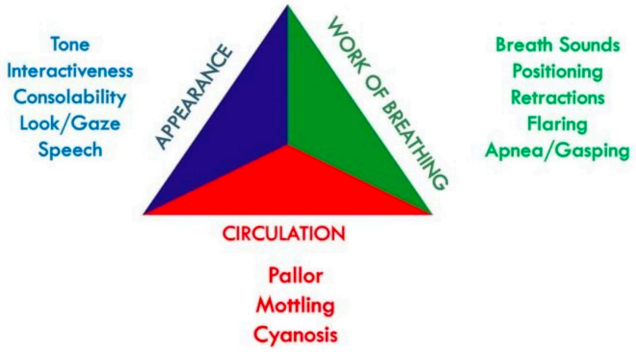
- AIRWAYS – are smaller and more prone to obstruction
- BREATHING – mechanisms (faster rate, reduced chest musculature)
  => early fatigue
- Crying or screaming at least indicates an open airway.

# Circulation




- Smaller BLOOD VOLUME => early shock – usually hypovolemic or distributive
- Higher METABOLIC RATE => fewer reserves – decompensation may be sudden
- Cardiac arrest most likely as a result of respiratory failure
- => hence “2 minutes of CPR” PRIOR to activating EMS in case of an UNwitnessed collapse if responding alone

# Appearance and Behavior

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Appearance and Behavior – affected by developmental stages AND OUR INTERACTIONS with the child

- Drop down to the child's level and watch for non-verbal clues
- Be friendly, calm and positive
- Be honest and firm (avoid traps such as "This won't hurt.")
- Use plain language
- Examine painful areas last
- Involve family/caregivers

# Other Key Considerations

Body Proportions – relatively large head size -> □ neck injury
– relatively greater surface area -> □ heat loss

Plasticity □ fracture risk due to bone flexibility BUT
□ risk of energy transmission and internal injuries

Permission/consent – where possible, contacting those responsible as soon as possible

Parent/guardians - importance of managing them and their concerns

Privacy/independence – important in the adolescent age group

Last but Not Least

Potential for child abuse:
mixed injuries (new/old/partially healed)
bilateral injuries
bruising of unusual patterns
inconsistent/vague history
and our duty to report suspected cases to appropriate authorities

# Features of Children

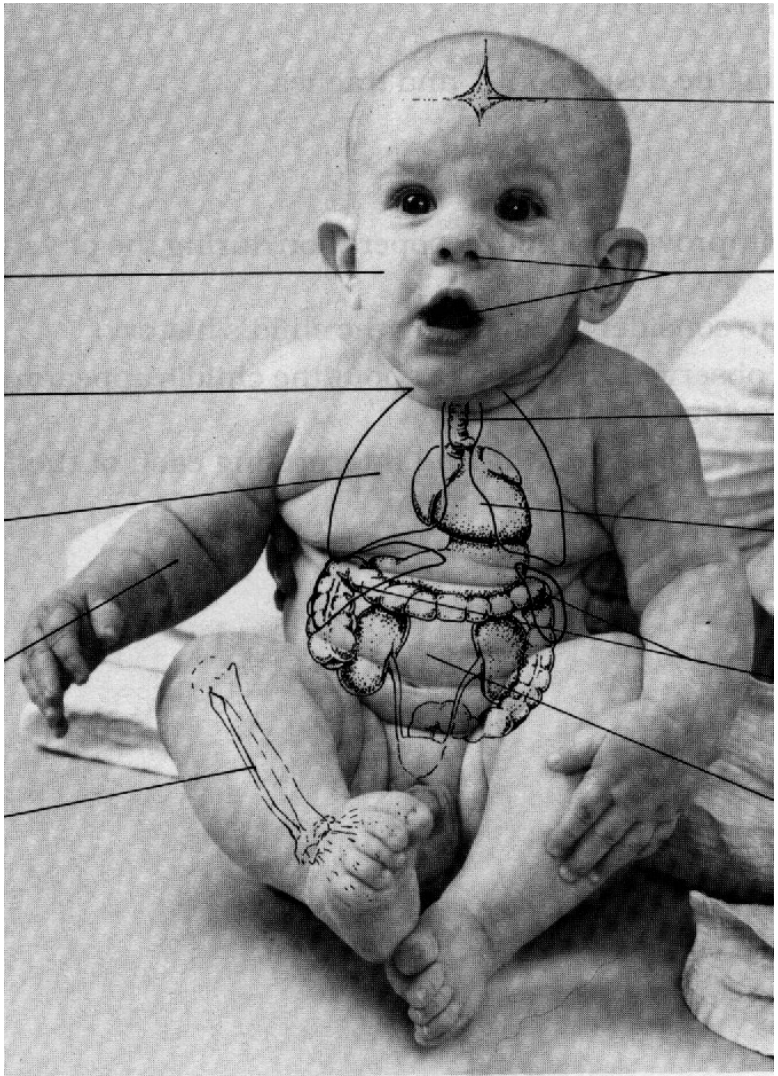
Head proportionately larger & heavier; prone to injury

Short neck

Faster respiratory rate chest muscles fatigue easily

Large body surface area, prone to hypothermia

Bones are softer; tend to bend & green stick fracture



Fontanel & open sutures

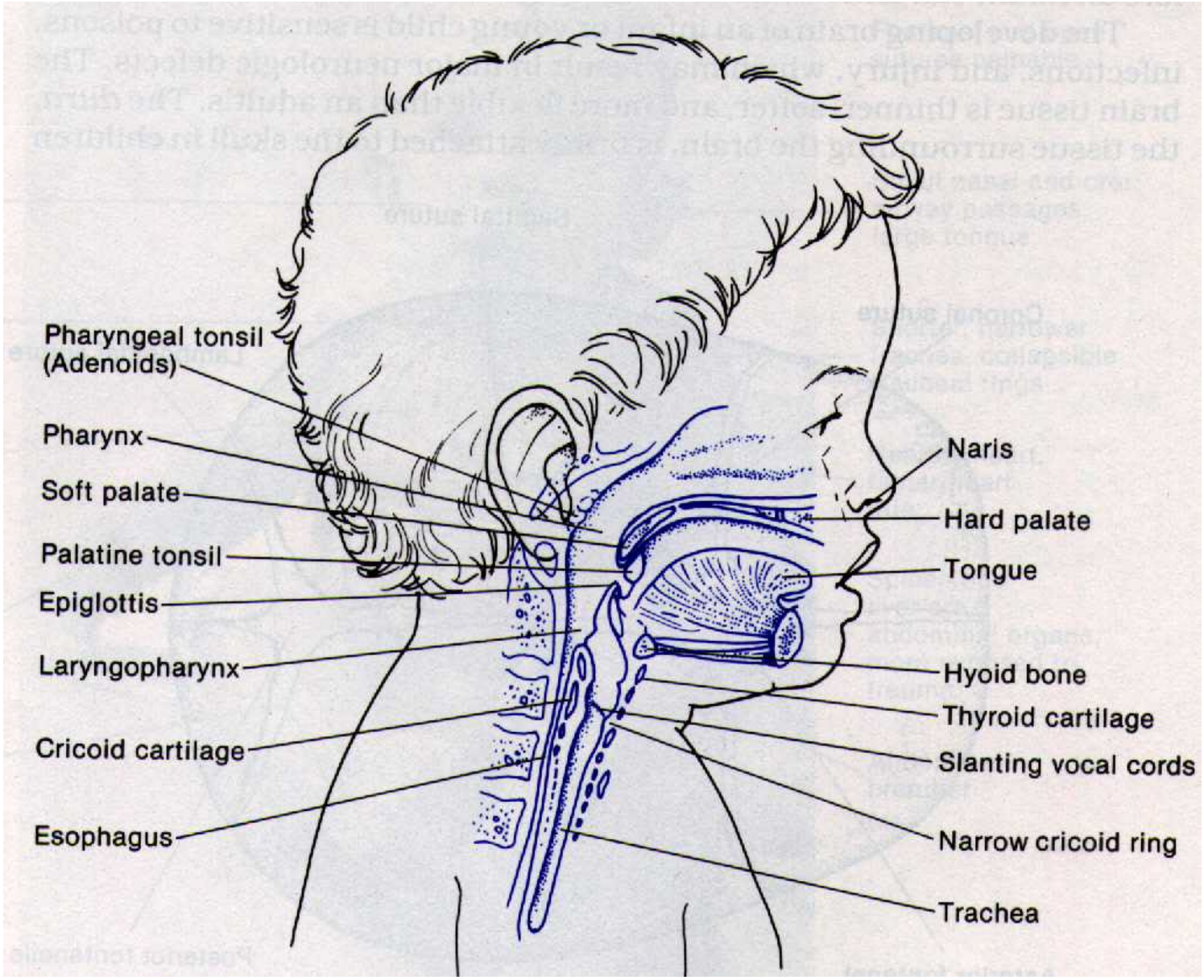
Small upper airway passages; large tongue

Shorter, narrower trachea; collapsible rings

Healthy heart; faster rate

Spleen & liver more exposed to trauma

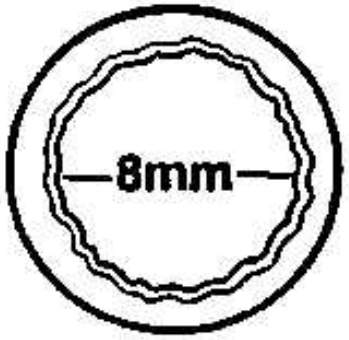
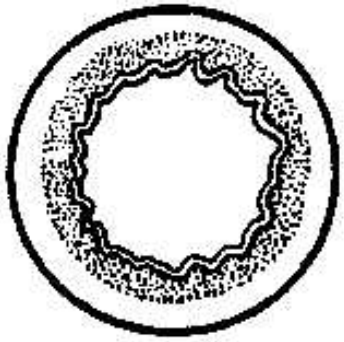
Abdominal breather


Pharyngeal tonsil
(Adenoids)
Pharynx
Soft palate
Palatine tonsil
Epiglottis
Laryngopharynx
Cricoid cartilage
Esophagus
Naris
Hard palate
Tongue
Hyoid bone
Thyroid cartilage
Slanting vocal cords
Narrow cricoid ring
Trachea

# Differences

- Tongue takes up more of the mouth and more easily obstructs the airway
- Trachea is narrow,  more flexible and prone to collapse or kinking
- Overall airway system is smaller
- Respiratory muscles are weaker, are more inefficient due to softness of ribs and have less endurance

# Airway Differences

| | Normal | Edema (1 mm) | Resistance |
|---|---|---|---|
| Infant |   |  | ↑ 16 x |
| Adult |   |  | ↑ 3 x |

# Respiratory Distress

# Impending Doom

# Progression of Distress

- 1) Tripod/Sniffing
- 2) Nasal Flaring
- 3) Head Bobbing
- 4) Intercostal Retractions
- 5) Prolonged Exhalation
- 6) See-saw Breathing
- 7) Diminished Chest Expansion
- 8) Skin Color Changes
- 9) Decreased Saturation
- 10) Tachy then Brady
- 11) Slowed Respir'n Rate
- 12) Respiratory Arrest

# Clinical Pearls

- Confusion, anxiousness, restlessness, listlessness, lethargy, quiet = impending respiratory doom
- Lying supine may compromise an airway problem
- Hyperextension = kinked trachea
- Slowing infant heart rate = impending respiratory doom

# Shock

Weight (kg) = 8 + 2(age in years)

Total Blood Volume (mL) = Weight x 80-90 mL/kg

| Age | Weight | TBV |
|---|---|---|
| 1 yr | 10 kg | 800 mL |
| 5 yr | 18 kg | 1440 mL |
| 10 yr | 28 kg | 2400 mL |
| 15 yr | 38 kg | 4000 mL |
| Adult | | 5000 mL |

# Shock


200 mL Loss

| Age | TBV | % Loss |
|---|---|---|
| 1 yr | 800 mL | 25% |
| 5 yr | 1440 mL | 14% |
| 10 yr | 2400 mL | 8 % |
| 15 yr | 4000 mL | 5 % |
| Adult | 5000 mL | 4 % |

# Compensation

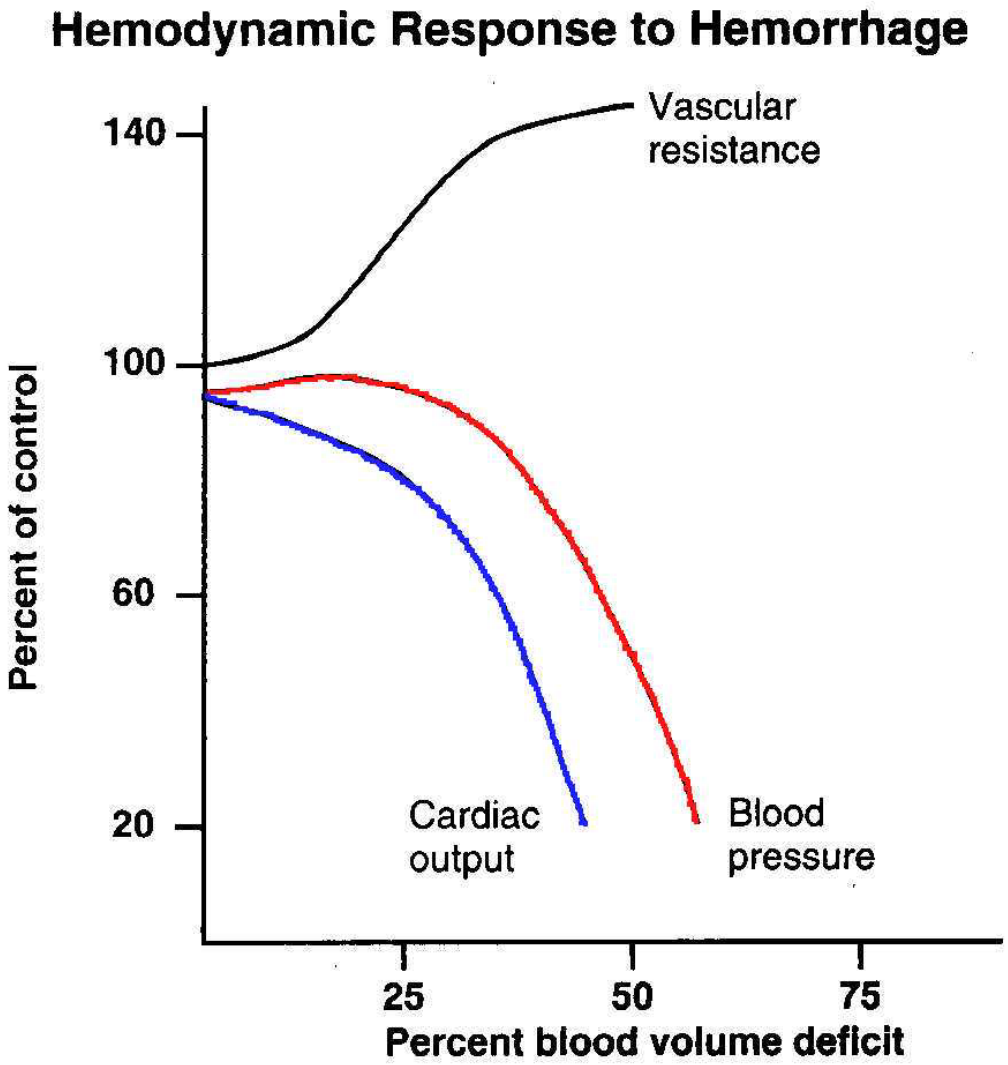


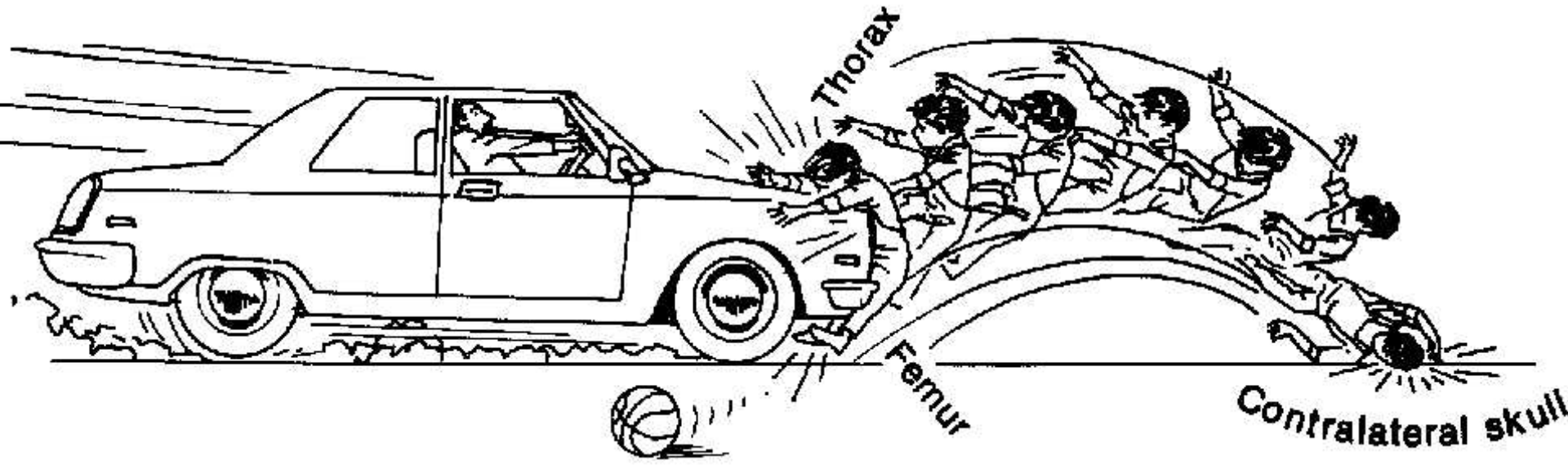

Fig 3. Model for cardiovascular response to hypovolemia from hemorrhage (based on normative data).[16]

# Clinical Pearls

- Children lose the same amount of blood from similar sized injuries as adults.
- Children have healthy hearts, flexible arteries and great cardiovascular capacity. They can appear surprisingly good in early shock.
- But when the ability to compensate ends, the child's vital signs crash rapidly.

# Proportionate Head Size

# Child Ballistics

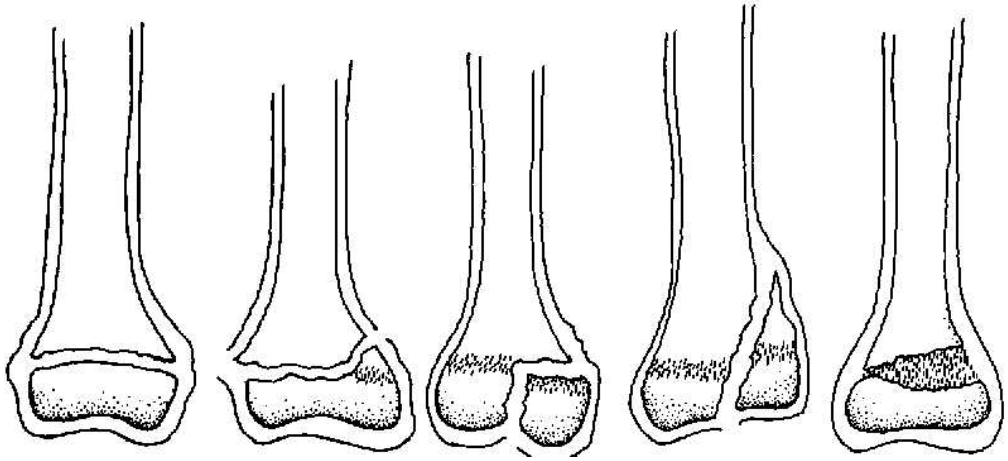


# Head Injuries

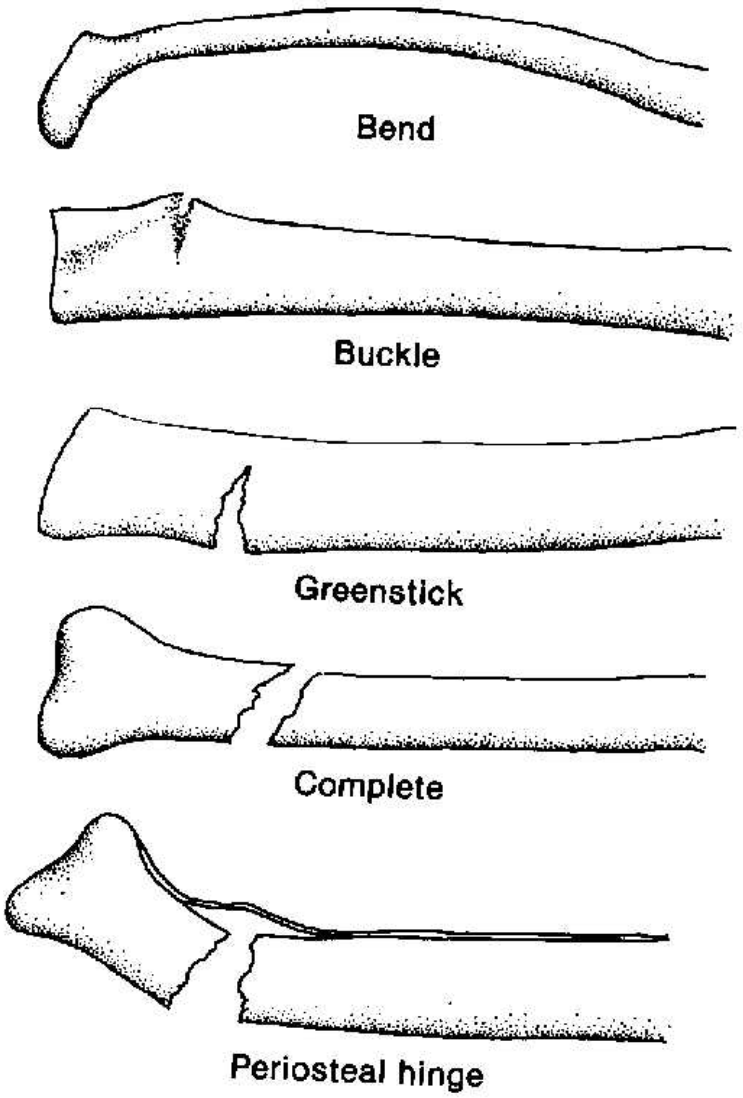
- 90% of pediatric trauma is blunt
- Head Injury is leading cause of trauma death - 80% of trauma deaths were head injured
- If survive the original insult - kids recover more often and more fully than adults

# Flexible Bodies

# Fractures



Fractures Through Epiphyseal (Growth) Plates



# Principles for Effective Exam

- Establish a rapport with both child & parent
  - Get at the child's eye level
  - Be caring and gentle
  - Avoid use of terminology
  - Make eye contact (but don't stare)
  - Talk to both child and parent
  - Try to give child some control
  - DO NOT LIE!

# Approach to Spinal Restriction of the Pediatric Patient

"Children are NOT miniature adults"

Terry Abrams MS MSc ACP
Canadian Ski Patrol

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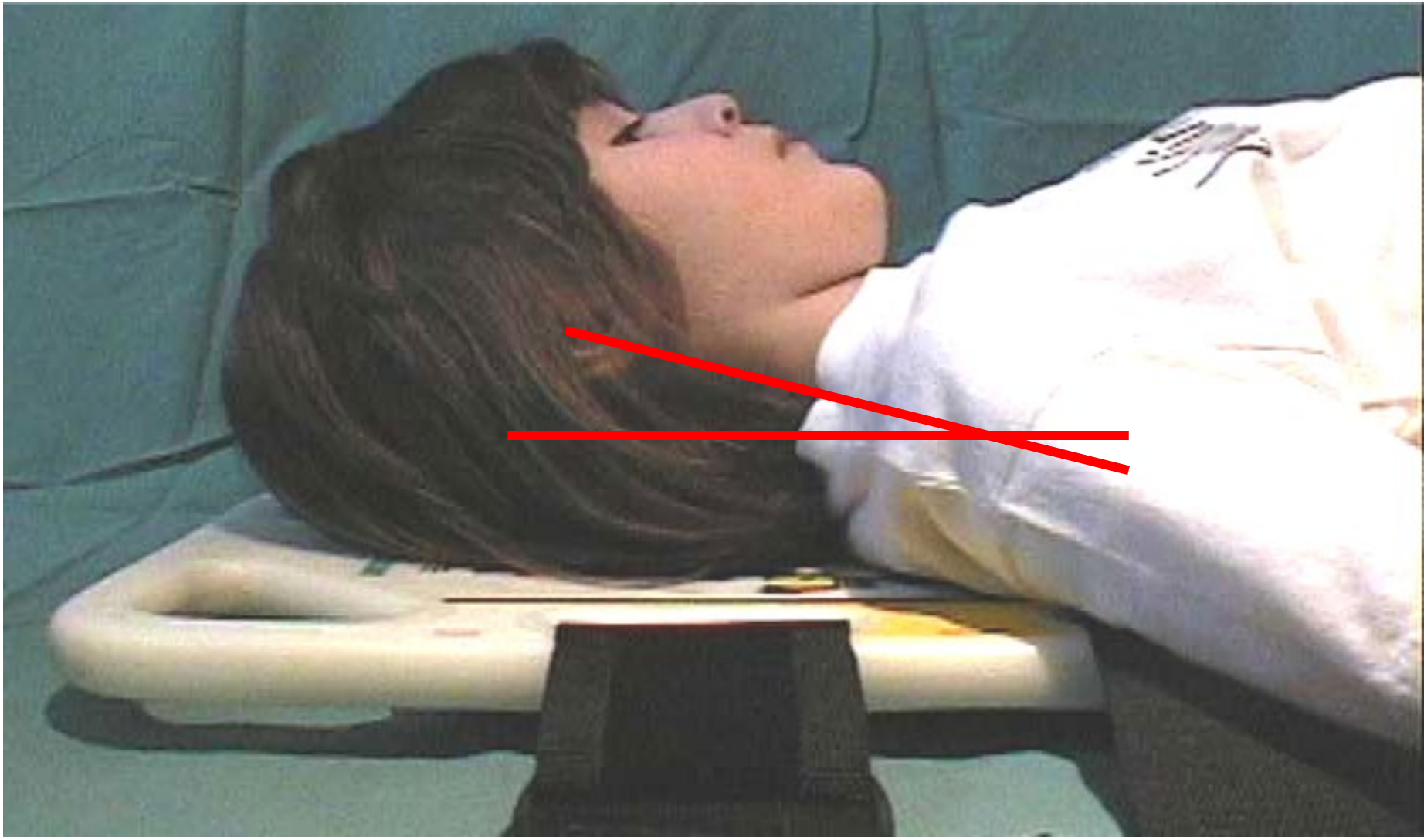
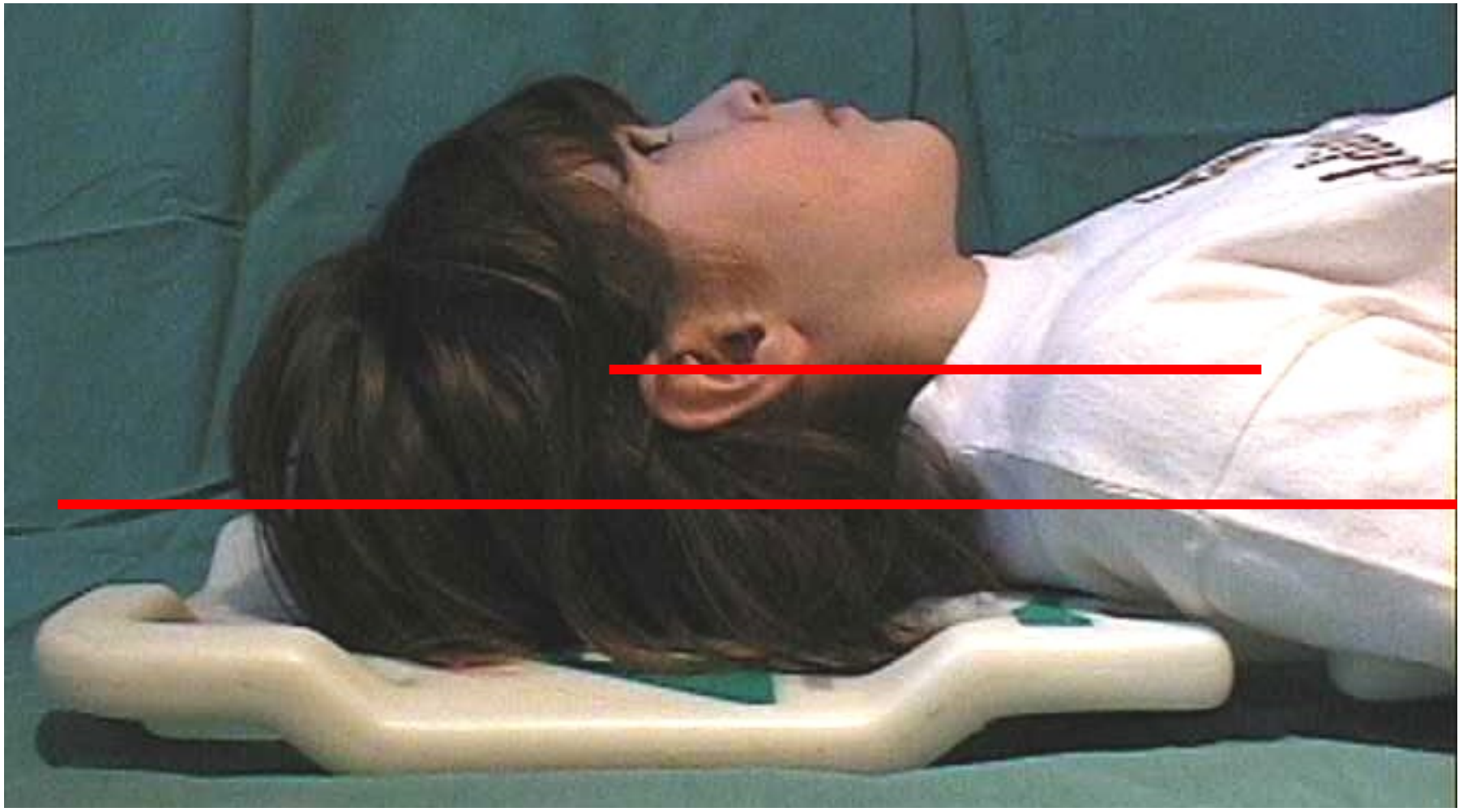
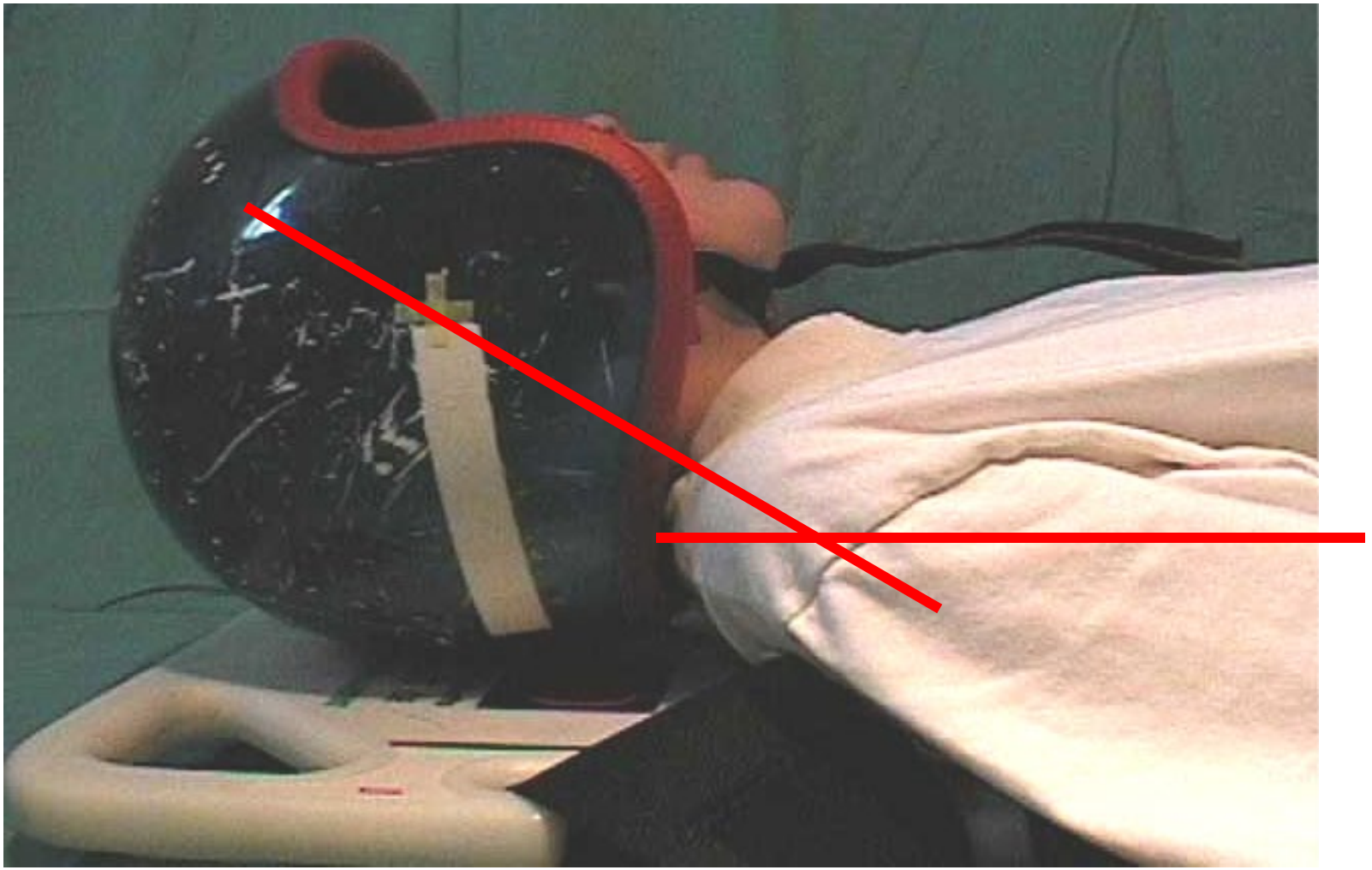
# Spinal Restriction



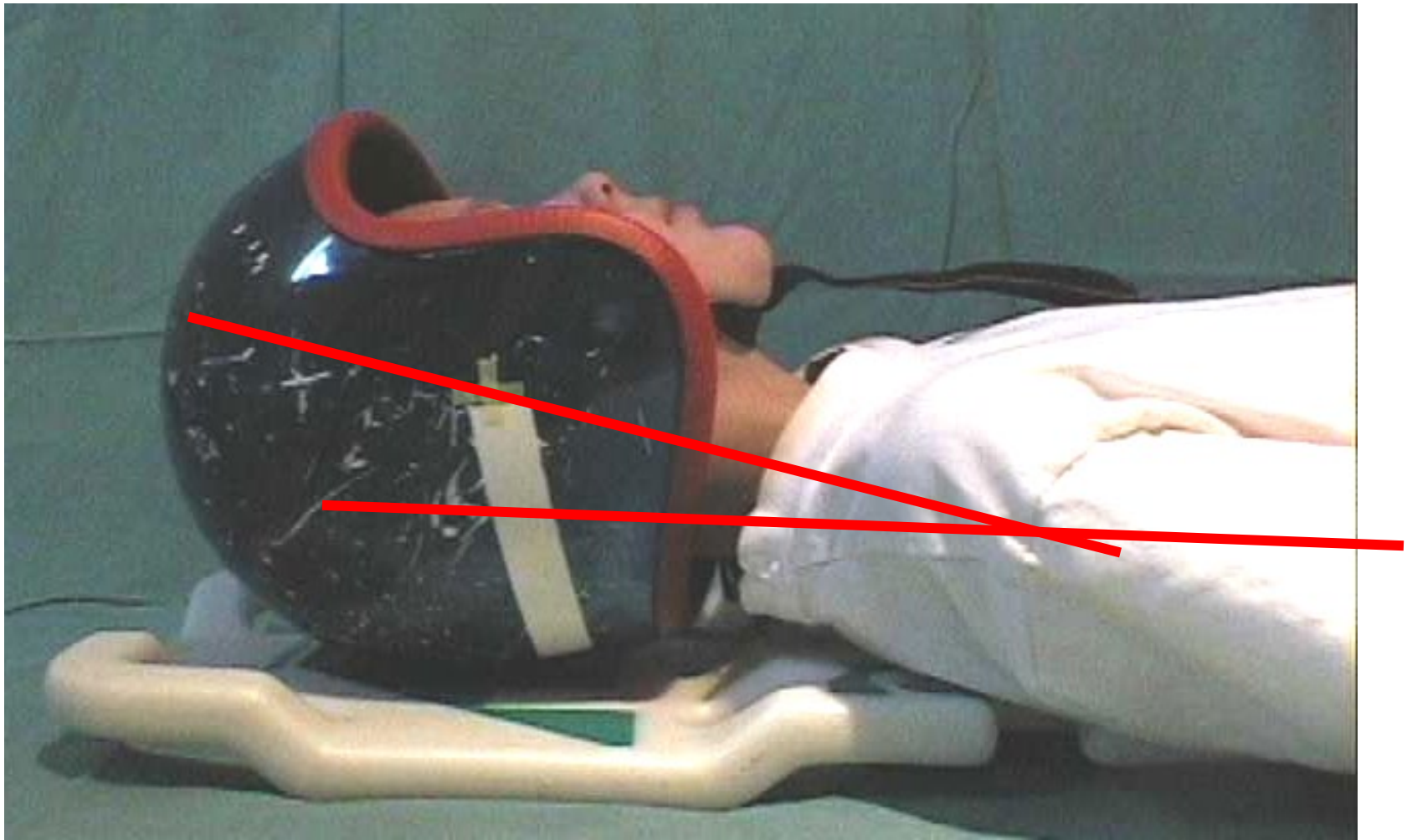
# Body Raised



# Helmets



# Helmets - Body Raised



# Child Seats

# C-Collars??

# It’s Never Too Soon