

Pediatric Polytrauma



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Pediatric Polytrauma



- A child who sustains multiple, potentially life-threatening injuries
 - Motor vehicle accidents
 - Falls
 - Gunshot wounds
- Global threat
 - 700,000 deaths/year (children < 15 y)



Pediatric Polytrauma is Different than Adult Polytrauma



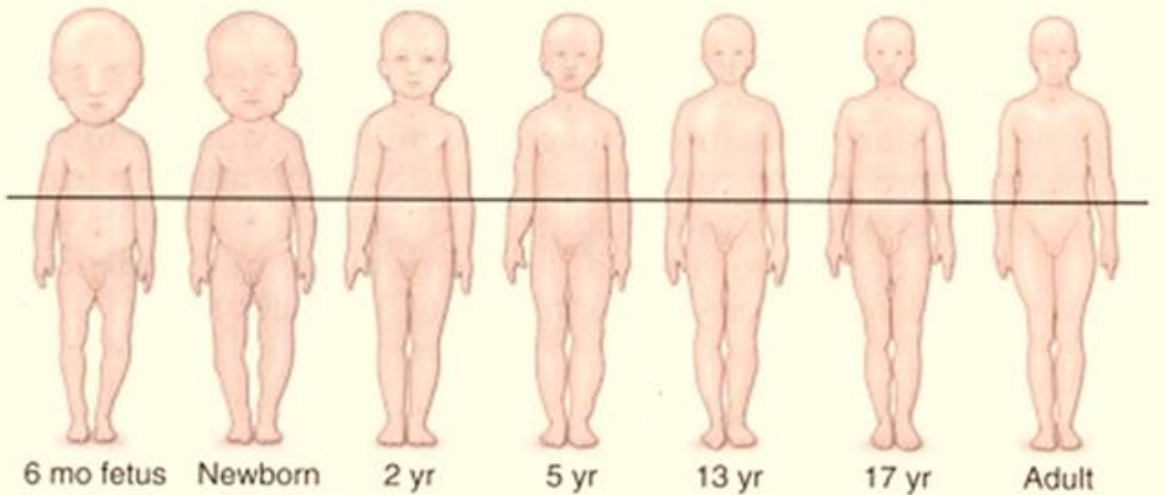
- **Child versus Adult**
 - Anatomy and physiology
 - Injury patterns
- **Role of Damage Control**
 - Response to Injury
 - Orthopedic priorities
- **Outcomes**



Child vs. Adult *Anatomic Differences*

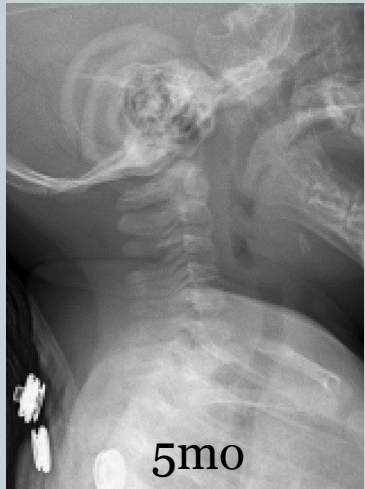


- Airway is more difficult to maintain
- Ligaments and joints are more lax
- Less muscle mass
 - Vital organs less protected



Pediatric Cervical Spine

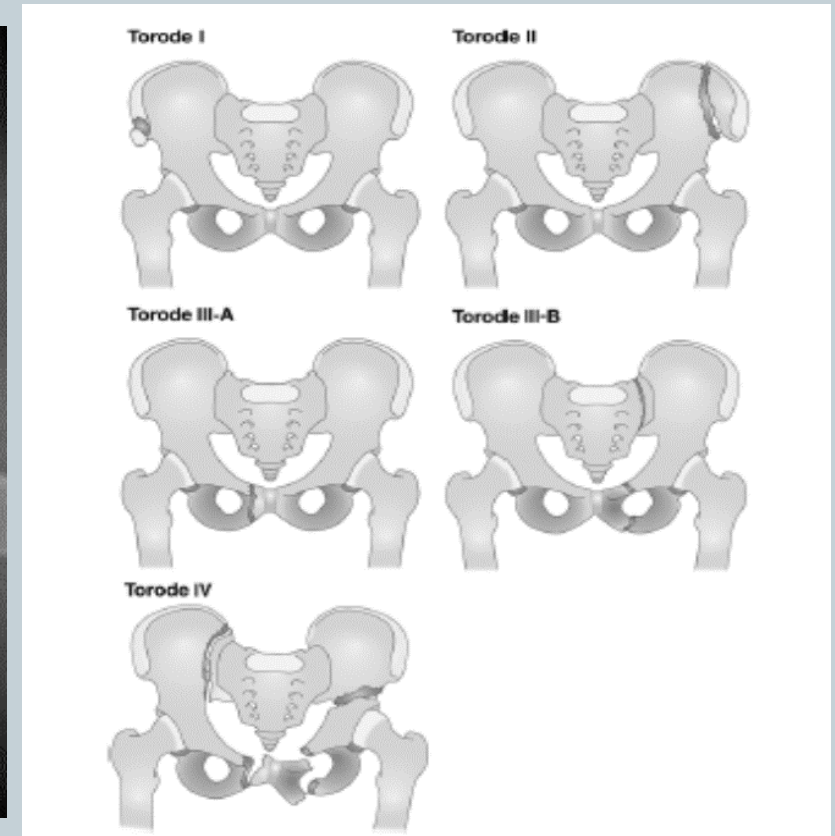
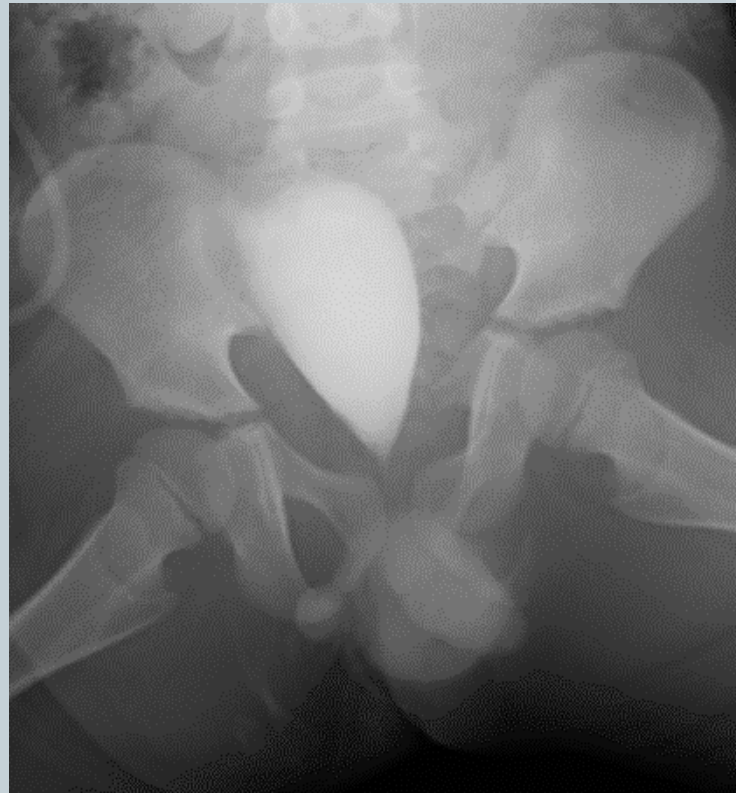
- Pediatric cervical spine injuries rare
 - Evaluation more challenging
 - Upper cervical injuries more common
 - ✦ SCIWORA



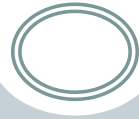
Pelvic Fractures



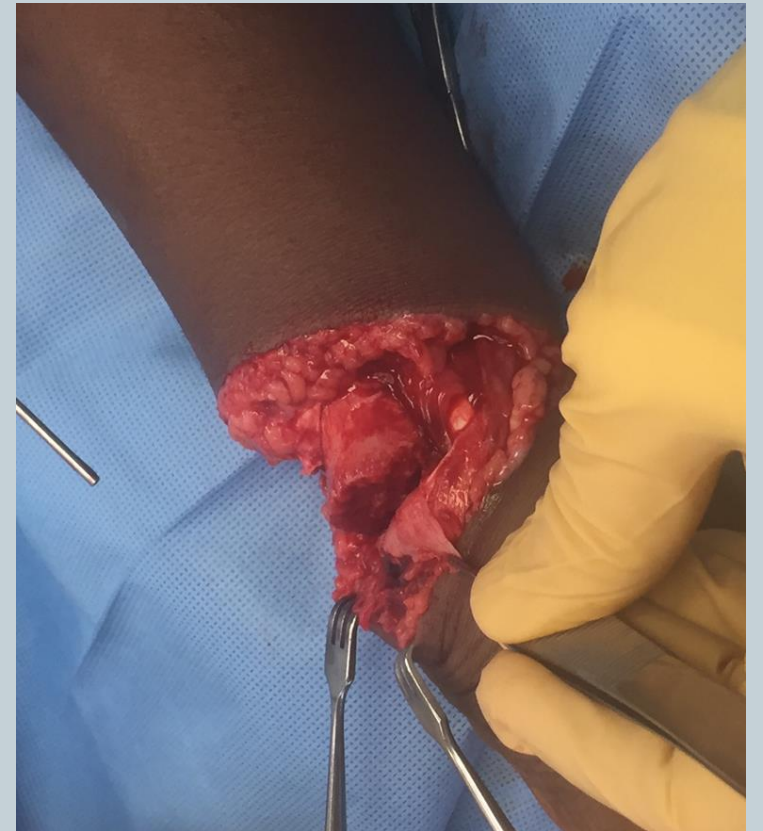
- Pediatric pelvis fractures
 - More elastic (single ring breaks)
 - Less hemorrhage
 - RARE cause of death



Extremity Fractures



- **Thick periosteum**
 - Open fractures less common
- **Open physes**
 - Salter-Harris fractures



Child vs Adult

Physiologic Differences

- Maintain blood pressure despite severe bleeding
 - CV collapse rapid and signaled by
 - ✦ Tachycardia
 - ✦ Loss of consciousness
 - ✦ Low urine output
 - ✦ Hypothermia



Child vs Adult *Injury Patterns*

Extremity fractures



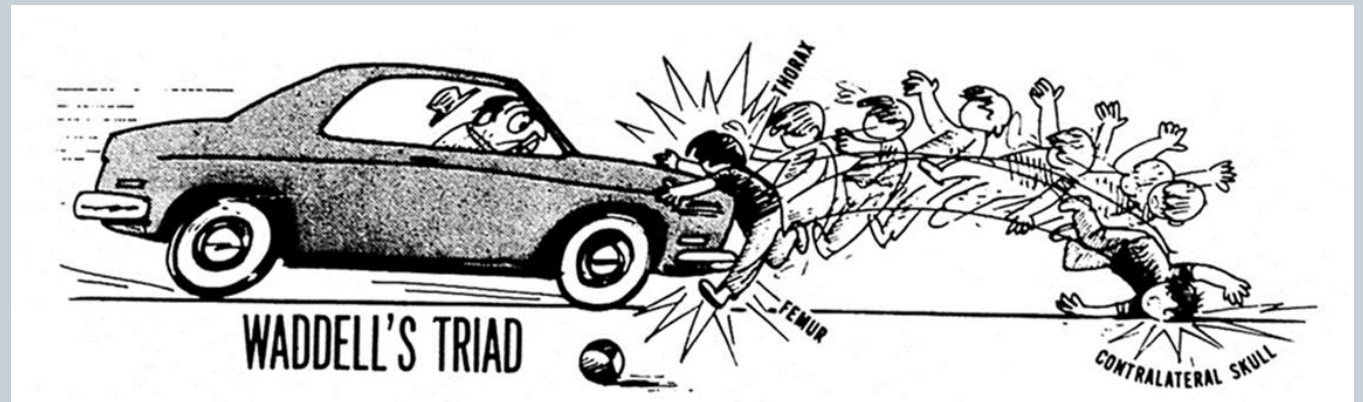
Head injuries



Thoracoabdominal
injuries



Pelvic/GU injuries

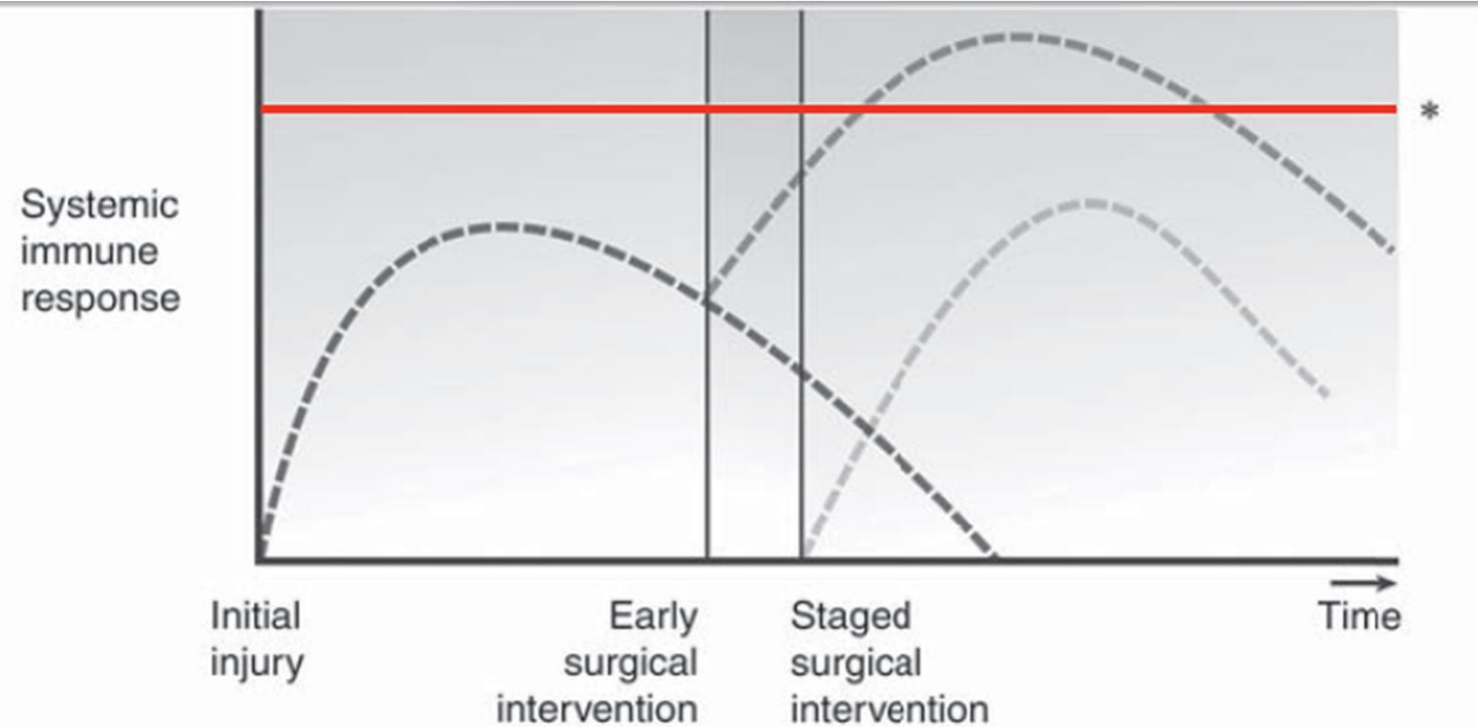


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DAMAGE CONTROL ORTHOPAEDICS

EVOLVING CONCEPTS IN THE TREATMENT OF PATIENTS
WHO HAVE SUSTAINED ORTHOPAEDIC TRAUMA

BY CRAIG S. ROBERTS, MD, HANS-CHRISTOPH PAPE, MD, ALAN L. JONES, MD, ARTHUR L. MALKANI, MD,
JORGE L. RODRIGUEZ, MD, AND PETER V. GIANNOUDIS, MD



*RESPONSE = Release of Systemic Inflammatory Response (SIR) and Complementary anti-inflammatory (suppressive) response (CAR) leads to Multiorgan failure (MOF)

The inflammatory response to injury in children

James H. Wood^a, David A. Partrick^a and Richard B. Johnston Jr^b

1. Children have a significantly lower incidence of Multi-organ Failure

-1% vs 25%

2. The timing of MOF is different than adults

-immediate vs 48h

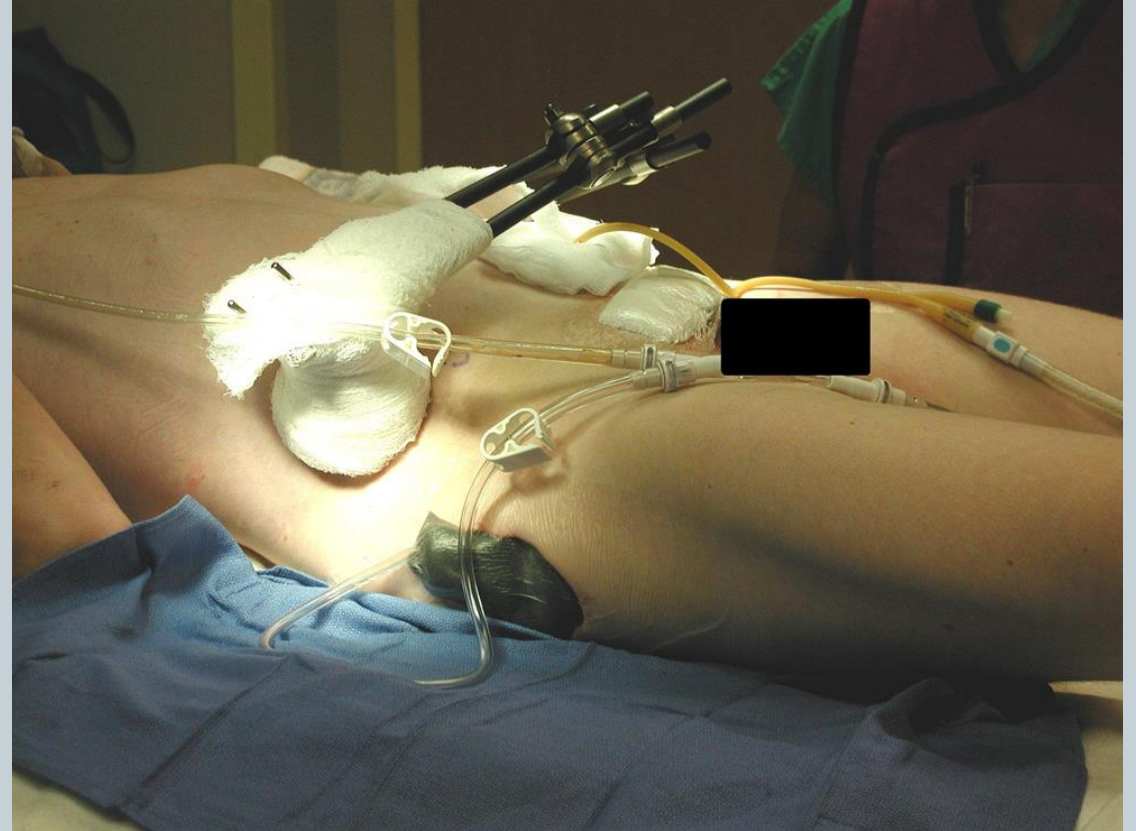
3. Children have a more local inflammatory response and less systemic response to injury

Pediatric Damage Control Orthopedics

Priority #1



- Save the child
 - Control massive bleeding
 - Protect the spine
 - Splint extremity fractures
 - ✦ Facilitates resuscitation



Pediatric Damage Control Orthopedics

Priority #2



- **Save the limb**
 - Revascularize/stabilize fractures
 - Treat compartment syndrome

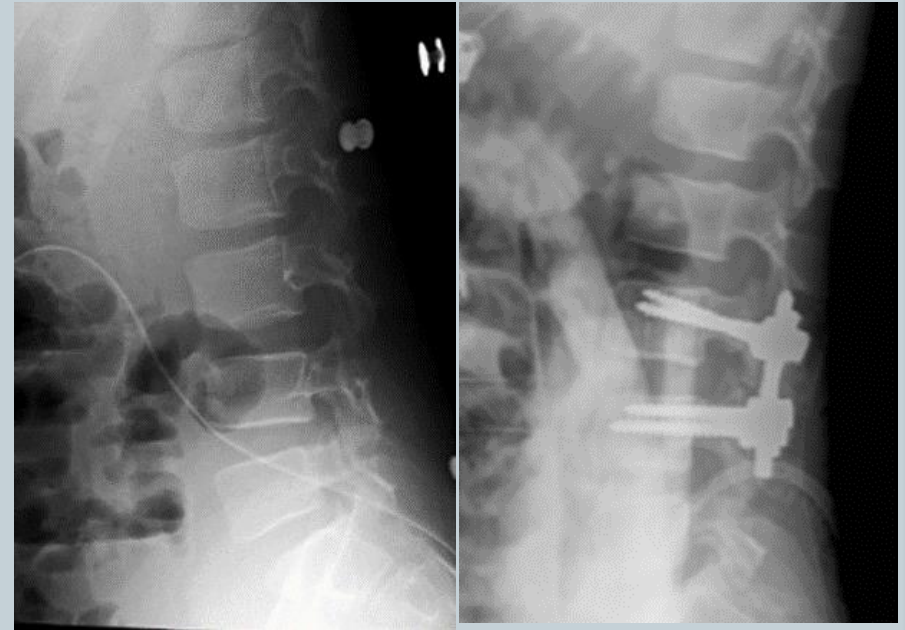


Pediatric Damage Control Orthopedics

Consider a New Paradigm



- 1. EMERGENCY care
 - Facilitate resuscitation
 - Wound dressing
 - Splint/traction
- 2. Definitive fracture care within 24-48 hours
 - Injuries with potential complications
 - Compartment syndrome
 - NV injury
 - AVN of hip
 - Femur fractures
- 3. Definitive pelvis/spine care individualized



Outcomes

Child vs Adult



- Morbidity and mortality
 - HEAD injury
 - Spine injury
- Outcomes **ALWAYS** better in the child vs adult



Summary

- Pediatric polytrauma is different
 - Anatomy and physiology
 - Response to injury
- Rethink damage control orthopedic concepts for children
- The child heals
 - Team approach yields best outcomes

