Playground Injuries

Evaluation and Initial treatment of acute orthopedic injuries
Priorities

• Trauma priorities over orthopedic injuries.
  – ABCs (Airway, Breathing, Circulation)
  – Head/Neck injuries
  – Internal injuries
  – Bleeding
Orthopedic Priorities

- Open Fractures
- Fractures without distal pulses
- Fractures that may require conscious sedation or a high level of pain control.
Interesting data

Of the incidents reported
67% involved falls or equipment failure
8% hazards around but not related to the equipment
7% collisions with other children or the equipment
7% entrapments
11% other
Approximately 15% of the injuries were classified as severe, with 3% requiring hospitalization.

Source: CPSC October 29, 2009

40 deaths were associated with playground equipment between 2001-2008.
Average age was 6 years; median age was 4 years.
27 deaths were the result of hangings or other asphyxiations
7 deaths were the result of head or neck injuries

Source: CPSC October 29, 2009

Top four equipment pieces associated with injuries
- Climbers- 23%
- Swings- 22%
- Slides-17%
- Overhead ladders- 9%

Source: CPSC October 29, 2009
Types of injuries

Most Common Injuries are:

- Fractures- 36%
- Contusions/Abrasions- 20%
- Lacerations- 17%
- Strains and Sprains- 12%
- Internal/ Organs- 5%
- Concussions- 2%
- Other- 8%

Source: NEISS Database, May 2009

Other Statistics

- Reported incidents with known ages, the 0-4 age group accounts for 54% of the data.
- Males account for 54% of the reported incidents where gender is recorded.
- Overall, a slight but significant decrease in injuries was recorded from previous data (1998-2000).
Anatomic review

- The major anatomic regions of growing bone include the epiphysis, physis (growth plate), metaphysis, and diaphysis.

- The epiphysis is the secondary ossification center located at the end of long bones and is separated from the rest of the bone by the cartilaginous physis. The epiphysis is cartilaginous at birth, with the exception of the distal femur.

- This cartilaginous epiphysis serves as a shock absorber, transmitting forces to the metaphysis.
Anatomic review

• The major anatomic differences between the adult and pediatric skeletal system include the presence of the preosseous cartilage, physis and a stronger osteogenic periosteum.
Fracture Patterns

• Plastic Deformity
  This deformity occurs when longitudinal force exceeds the ability of bone to recoil to normal position.
Buckle (Torus) Fractures

A torus fracture occurs at the junction between the porous metaphysis and the denser diaphysis.

This fracture type is the result of longitudinal forces on the bone with compressive buckling secondary to the porous nature of pediatric bone.

This buckling appears as a bulge in the metaphyseal cortex with concomitant disruption of the normal bone contour.
Fracture Patterns

• Buckle (Torus) Fractures
Fracture Patterns

• Greenstick Fractures
Fracture Patterns

• Physeal Fractures
The most significant difference between pediatric and adult fractures is the presence of long-bone growth plates.

These growth plates are highly susceptible to fracture, since their cartilaginous composition represents a weak point in the bone.
Fracture Patterns

- Physeal Fractures
  Salter-Harris Classifications
Fracture Patterns

• Complete Fractures

Complete fractures propagate through the entire bone.

These fractures are sub-classified by fracture line appearance: transverse, spiral, oblique, and comminuted. A transverse fracture line occurs at a right angle to the long axis of the bone.
Clavicle Fractures

• The clavicle is the most common location of a pediatric fracture.
• This fracture is seen at all ages and represents 10%-15% of all pediatric fractures.
Clavicle Fractures
Elbow Fractures

• Elbow fractures represent 15% of all pediatric fractures with supracondylar fractures occurring most commonly (50%-70%) followed by lateral condyle fractures.
Elbow Fractures

- Supracondylar Humerus Fracture
Forearm Fractures

- Fractures of the radius and/or ulna represent 10%-45% of pediatric fractures.
Wrist / Distal Forearm Fractures

- The majority (up to 84%) of radius and ulna fractures involve the wrist and distal forearm.
- The fracture mechanism is typically a fall on an outstretched hand with subsequent displacement the result of wrist position during the injury.
• Colles Fracture
A Colles fracture is a transverse fracture that occurs proximal to the distal radial physis with dorsal displacement of the distal segment and volar angulation.
Wrist / Distal Forearm Fractures

• Smith Fracture
A Smith fracture is the reverse of a Colles fracture, with volar displacement and dorsal angulation.

Figure 6. Smith's Fracture
Lower extremities

• Fractures of the lower extremities in pediatrics occur less commonly than fractures to the upper extremities.
• Tibial and fibular diaphyseal fractures are the most common pediatric lower extremity fractures, and fractures of the femur and ankles are less common.
Femoral Shaft Fractures

- Femur fractures are common in pediatric patients.
- They occur most commonly in the femoral shaft (> 60%).
- The energy needed to sustain a femur fracture is generally moderate to high.
Femoral Shaft Fractures
Ankle Fractures

• Ankle injuries are among the most common orthopedic injuries seen in the ED.

• In skeletally immature children, the most common acute injury of the ankle is a Salter-Harris type I fracture of the distal fibula.
Triplane Juvenile Fractures

- A triplane fracture is a unique physeal injury that occurs during the closure of the growth plate.
- This fracture type occurs when the medial physis of the tibia is closed, usually around 12-14 years of age.
- It is called "triplane" because the injury has three components (coronal, sagittal, and transverse).
Triplane Juvenile Fractures
Resources

Common Orthopedic Injuries in the Pediatric ED

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Part II

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Statistic Sources


Data was obtained between 2001-2008 by the CPCS, National Electronic Surveillance System (NEISS). NEISS collects playground product-related data from a selected sample of more than 100 hospital emergency departments located throughout the United States. Thus, only emergency room injuries are recorded and the national statistics are estimates. All statistics have been adjusted to reflect out-of-scope cases that were reported to NEISS.