Head to Toe: Common Orthopedic Issues of the School Aged Child

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Overview

• We will be discussing:
  – Mechanism, treatment, and prognosis of frequently seen orthopedic injuries
  – Symptoms, treatment, and prognosis for orthopedic conditions commonly seen in the school age child

Objectives

• To recognize common Orthopedic issues that may occur in the school setting
• To understand which orthopedic injuries may require emergent attention
• To provide initial treatment for Orthopedic issues which occur in the school setting.
Clavicle Fractures

- Commonly occur as the result of a fall either onto the shoulder or an outstretched hand.
Clavicle Fractures

• Ice initially may help decrease swelling and NSAIDS are generally very effective at managing any pain associated with the injury.

• Very rarely require surgery and are most commonly treated with a sling for comfort.

Clavicle Fractures

• Anticipate upper extremity activity restriction
• Patients generally recover well without complication.
• If this injury occurs at school and tenting of the skin is noted or the skin is broken, consider this an orthopedic emergency.

Humerus Fracture

• Proximal humerus fractures are most commonly seen in adolescents due to increased participation in sports.
  – May result from direct or indirect trauma
  – Or overuse injuries (commonly seen in throwers).
Humerus Fracture

• Ice is helpful initially to decrease swelling and NSAIDS are effective for controlling the pain
• These fractures are commonly treated with immobilization using a sling
  – Generally do not require casting
• Proximal Humerus fractures can usually be treated non operatively.
  – Tremendous remodeling potential

Supracondylar Fractures

• Supracondylar Fractures make up half of all pediatric elbow fractures and are most commonly seen in elementary age children.
• Frequently occur as the result of a fall from a moderate height (monkey bars) on an outstretched hand.
• They’re categorized as being either Type I, II, or III.
Supracondylar Fractures

- **Type I** – Nondisplaced and generally treated with casting. You can expect the child to be in a long arm cast with the elbow bent at 90˚.
- Casting typically lasts around three weeks.

Supracondylar Fractures

- **Type II** fractures are displaced though the posterior cortex remains intact.
- This injury is treated surgically, requiring a reduction and percutaneous pinning. Pt is then casted at 90˚ for around 3 weeks before pins are pulled in the office.

Supracondylar Fractures

- **Type III** Supracondylars are completely displaced with no cortical contact
- Require surgery, either a closed reduction and percutaneous pinning or an open reduction.
- Expect pt to be in cast approx. 3 weeks. Gym restriction for 3 months or more.
Buckle Fractures

- Think of this as a “crinkle” in the bone.
- Can commonly be treated with a wrist splint and rest from activity for 3-4 weeks.
- Depending on activity level and reliability of child to maintain activity restriction, these fractures may be casted.

Upper Extremity Injuries Recap

- Any injury that occurs at school warrants an assessment of distal pulses and cap refill.
- Consider it an Orthopedic Emergency if you have weak or absent pulses, cap refill longer than 3 seconds, limb deformity, or any open fracture.
- NPO if any of these are present.

Hips
Slipped capital femoral epiphysis is a condition of the adolescent hip. Must have open growth plates to occur. Presents as groin or thigh pain and sometimes knee pain. May be unilateral or bilateral. Most commonly seen in:
- Male
- Obese
- African American

Stable VS Unstable

A patient will be able to bear weight on a stable SCFE. They will not be able to bear weight on an unstable SCFE.

*However…When a SCFE is suspected, the pt should immediately be made NWB & NPO!!!!!
Treatment requires screw fixation.
If the slip occurs unilaterally, the unaffected side may be pinned prophylactically.
A severe or long term slip may require a larger procedure including an open reduction or femoral osteotomy.

SCFE

- Post op
  - Unstable SCFE requires 6 weeks of strict NWB and 6 weeks of WBAT.
  - Stable SCFE requires 6 weeks of partial WB and 6 weeks of WBAT.
  - Expect all SCFE pts to be on crutches for 12 weeks.
  - Gym restriction until physes close (few months – year).

Legg-Calve-Perthes Disease
Legg-Calve-Perthes Disease

• Idiopathic avascular necrosis of the proximal femoral epiphysis in children
• Epidemiology
  – Incidence: 1 in 1200 children
  – Demographics
    • 4-8 years is most common age of presentation
    • Male to female ratio is 5:1
    • More commonly seen in urban populations versus rural
    • Can occur in other hip at later date

Legg-Calve-Perthes

• Symptoms
  – Painless limp
  – May have hip, thigh, or groin pain.
  – Loss of internal rotation and abduction
  – LLD is a late finding

Legg-Calve-Perthes Disease

• 4 Stages
  – Initial: Infarction produces a smaller, sclerotic epiphysis
  – Fragmentation: Femoral head appears to fragment or dissolve
  – Reossification: Ossific nucleus undergoes regeneration as new bone appears and necrotic bone is resorbed
  – Healing: Femoral head remodels until skeletal maturity
Legg-Calve-Perthes

- Treatment may involve:
  - Observation
  - Activity restriction and protected WB until reossification is achieved.
  - Physical Therapy may be prescribed
  - 40% may require an osteotomy later.

- Outcome is dependent on severity and age
- Surgery is sometimes an option.
- Very important to follow restrictions to allow femoral head to remodel.

Lower Extremity Injuries

Femur Fracture
Femur Fractures

- Increased rates in toddlers and then again in adolescents
- Must have high suspicion for abuse in young children
- In toddlers, may be the result of a fall
- In adolescents, caused by high energy impact (MVA, pedestrian vs car)

Symptoms
- Pain
- Inability to bear weight
- Deformity

Femur Fractures

- Any injury that occurs at school warrants an assessment of distal pulses and cap refill.
- Consider it an Orthopedic Emergency if you have weak or absent pulses, cap refill longer than 3 seconds, limb deformity, or any open fracture.
- NPO if any of these are present.

Femur Fractures

- Femur fractures resulting from low energy impact, consider:
  - Osteogenesis Imperfecta
  - Bone Tumors
  - Osteopenia
Femur Fractures

- Treatment depends on age and fracture pattern
- Infancy-8 years, may be treated with a Spica cast or ORIF
- Student can attend school in Spica
  - Will require assist with diapering
  - Hippo Car Seat

Femur Fractures

- In an older child, ORIF with a plate or an IM nail may be utilized to treat fracture.
  - 3-4 months of activity restriction with slow return to play
  - May require wheelchair or crutches at school
  - May require special transportation
  - May initially require assistance with toileting.

Osgood Schlatter

http://www.orthobullets.com/sports/3029/osgood-schlatter-tibial-tubercle-apophysitis
Osgood Schlatter

- Apophysitis of the tibial tubercle caused by stress from the extensor mechanism
- Seen most often in jumpers (basketball, volleyball, sprinters).
- More commonly affects boys than girls and typically seen in 12-15 year olds males and 8-12 year old girls.

Osgood Schlatter

- Treatment
  - Rest/Activity Modification
  - Ice
  - NSAIDS
  - Severe Osgood Schlatter may require immobilization
- Kids will outgrow this eventually.

Ankle Injuries

*Ankle Sprains vs Ankle fractures*

Ankle sprains and ankle fractures very similar in their symptoms
Ankle Sprains

Ankle sprain is caused by excessive stretch to the ligaments of the ankle

- Fall that causes ankle to twist
- Walking or running on an uneven surface

Ankle Sprains

Common symptoms

- Tenderness above or in front of the ankle
- Swelling
- Bruising
- Pain

Lateral ankle sprains are one of the most common injuries in children who play sports
Mild Sprain-Grade I

• Minimal swelling and tenderness just in front of lateral aspect of the ankle
• Mild stretching of the ligaments without joint instability
• Can weight bear

Management:
• Rest, Ice, Compression, Elevate

Moderate Sprain- Grade II

• Partial tear or rupture of the ligament without joint instability
• Moderate amount of swelling
• Tenderness present just in front or below ankle bone
• Can weight bear

Management:
• Rest, Ice and Elevate
• Ankle support either with splint or cast for 2-3 weeks
• Ankle strengthening exercises
• May return to regular activity once muscle strength is regained, tenderness resolved, and range of motion resolved
Severe Sprains- Grade III

- Complete rupture of ligament with joint instability
- Severe amount of swelling
- Ankle discoloration
- Broad area of tenderness
- Can not weight bear

Severe Sprain- Grade III Management

- Rest until painless
- Elevate
- Ankle immobilization- usually with a short leg walking cast for 2-3 weeks
- Strength training exercises to reduce the risk of recurrent injury
- Depending on severity may require surgery

Ankle Sprain Management

Other Treatment Options

- NSAIDS to control pain and swelling
- Splint or cast
- Activity restrictions
- Crutches/walker and wheelchair for distance
Ankle support options for Sprains

Ankle Fractures

This fracture may have occurred as a result of twisting, turning or rolling of the ankle

Ankle Fractures

Common Symptoms

- Bruising around the ankle that may extend to the foot
- Severe pain
- Swelling
- Bony tenderness
- Tears or opening in the skin
- Inability to move toes or ankle
- Deformed or crooked appearance of the ankle
Treatment of Ankle Fractures

Non operative
- Immobilization - cast or boot usually for about 4-6 weeks
- May or may not be weight bearing
- If not weight bearing, then in 4-6 weeks will transition to weight bear as tolerated

Treatment of Ankle Fractures

Operative
CRPP (closed Reduction and Percutaneous Pinning)
or
ORIF (Open Reduction Internal Fixation)
- May have short leg cast or boot immobilization
- May be weight bear as tolerated.

Tibia/Fibula Shaft Fractures
- Pain or swelling in lower leg
- Obvious deformity
- Bruising or discoloration
- Inability to stand or walk
Tibia/Fibula Shaft Fracture Treatments

- Treatment depends on the location of the fracture, complexity or severity

Non surgical option:
- Cast for immobilization - 6 to 8 weeks
- Non weight bearing to allow bones to heal properly
- Use of crutches/walker

Tibia/Fibula Fractures Treatments

Surgical Option:
- Severe or complicated fractures may require internal fixation (metal rods or pins) to hold bone fragments in place
- This will allow for alignment and help the bone to heal
- May or may not be casted

Foot/Toe Fractures
Foot/Toe Fractures

Usually as a result of crushing injury or impact of a falling object

***Remember, if there is blood under the nail then this should be considered an open fracture and require immediate attention***

Foot/Toe Fractures Treatment

- Rest
- Activity restriction
- Immobilization- casting or rigid shoes
- Surgery- depending on if fracture is displaced

Foot/Toe Fractures

Non Operative Treatments

- Stiff soled shoe or walking boot with weight bearing as tolerated
- Buddy tape
Metatarsal Fractures

- Gradual pain at the top of foot
- Swelling
- Pain with activities
- Pain progresses with daily activities such as walking

Metatarsal Fractures Treatment

- Rest
- Activity restriction- use crutches or wheelchair sometimes used to off load weight and allow healing
- Immobilization- casting or rigid shoes
- Surgery- depending on if fracture is displaced

Stress Fractures

What are they and why do they occur?

- Stress fractures are an overuse injury caused by repetitive stress to the bone.
- Bone health may be at risk (menses? diet?)
- Usually to shin bone or foot bone
- Can be seen on Xrays, sometimes can only be identified on an MRI/bone scan.
Stress Fracture Symptoms

- These fractures usually occur in the runner or child who plays sports
- Usually involves pain and inflammation in the foot or lower leg
- The pain tends to worsen over time

Stress Fracture Treatment

- Rest
- Ice
- Compression
- Elevate
- NSAIDS - help with swelling and pain
- Restriction of activity and weight bearing for a period of weeks to months depending on severity of injury
- May be casted or use a walking boot to protect from further damage and to allow rest

Casts

Reason for Casting:

- Immobilization of fracture or sprains.
- Correction of a deformity – clubfoot
- Improve compliance with activity limitations
- Stretching – of tendons/muscles in arms or legs
- Postsurgical immobilization to allow for healing
- Occasionally, restricted gym activities may be allowed with casting
General Cast care

- Keep cast clean and dry
- Elevate the cast above heart level to decrease swelling
- Do not scratch the skin under the cast by inserting objects or fingers inside the cast
- No lotions or powders in cast

Cast

Casts may be made from several different materials:

- Plaster - white color
- Fiberglass - variety colors, patterns and designs
- Cotton and other synthetic materials are used to line the inside of the cast to make it soft and to provide padding around bony areas, such as the wrist or elbow.

Special waterproof cast liners may be used under a fiberglass cast, allowing the child to get the cast wet. They can be submerged in clean water only; no salt water or ponds.
General Cast Care - Post Op

Call Parent and/or MD if:
- Child feels increasing pain and tightness in the injured limb
- Develops excessive swelling above or below the cast
- Can't move the toes or fingers of his or her injured limb or they become blue or cold
- Develops a crack, soft spots or a foul odor in his or her cast or gets the cast soaking wet and doesn't dry it properly
- Numbness or tingling in the injured hand or foot
- Develops a fever of 101 F (38.3 C) or higher

After Cast Removal

- Broken bones take several weeks to months to heal to full strength
- Activity restrictions may be in place for weeks to months after casting of an injury
- Restrictions stay in place to allow bones to regain full strength and joint motion, flexibility and muscle strength to return to normal

Questions