

Running Injuries in Children and Adolescents

- Cook Children's SPORTS Symposium
- July 2, 2014

Running Injuries

- Overuse injuries
- Acute injuries
- Anatomic conditions

Overuse Injuries

- Pain that cannot be tied to an acute event
- Swelling
- Changes in form or technique
- Decreased interest in practice

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Overuse Injuries

- Osteochondroses
- Tendinitis
- Stress reaction
- Exacerbation of anatomic condition
- Idiopathic anterior Knee pain

Osteochondroses

- Osgood-Schlatter's - tibia tubercle
- Sever's - calcaneal apophysis
- Van Neck's - ischium

Osgood-Schlatter's

- Traction induced inflammation of the tibial tubercle apophysis (growth plate)
- Self limited
- Boys > girls ages 10-15
- Prominent tibial tubercle and characteristic x-ray findings of fragmented appearance

Sinding-Larsen-Johannsen

- Similar to Osgood Schlatter but at the distal pole of the patella
- Self-limited - ages 10-12
- Traction changes on x-ray from the patellar tendon
- Similar treatment with quad and hamstring stretching, ice massage, and activity modification



Osgood-Schlatter Sinding-Larsen-Joh

Sever's

- Inflammation of the Calcaneal apophysis (growth plate)
- At the attachment of the Achilles tendon proximally and plantar fascia distally
- Ages 9-14 Boys > girls
- Achilles stretching, ice massage, +/- heel cups or orthotics, activity modification (may be necessary)

Tendinitis

- Quadriceps/Patellar tendon
- Pes anserine (hamstrings)
- Achilles
- Flexor Hallucis, Peroneals, Tibialis Posterior
- No x-ray changes

Patellar Tendinitis

- Very common in junior high athletes - girls > boys
- Traction of tight quads, rapid growth and increased activity
- Responds well to stretching, activity modification and PT if they are deconditioned

Pes Tendinitis/Bursitis

- Extremely common in adolescents in conjunction with patellar tendinitis
- Medial hamstring insertions
- Anteromedial proximal tibia pain/tenderness
- Tenderness increased with resisted contraction of hamstrings
- Stretching, ice massage, activity modification, PT

Achilles/Lesser tendons

- Older children - no heel pain (such as in Sever's)
- Pain with resisted active motion of specific tendons and tenderness at insertion or along the course
- Rest, Activity modification, stretching
- Prevention

Medial Tibia Stress Syndrome

- Pain at the posteromedial tibia (origin of the soleus muscle) not on the bone
- Prolonged symptoms - must rule out stress fracture or other rare causes

Stress Fracture

Common Sites

- Tibial shaft
- Proximal tibia
- Foot (cuboid, metatarsals, etc.)
- Femur
- Lumbar spine (spondylolysis)

Stress Fractures - L Ext.

- Tibia
 - Generally mid shaft pain --- similar to that of “shin splints”
 - Requires prolonged avoidance of activity and limited weight bearing
 - Endurance athletes, esp. girls at higher risk (cross country, gymnastics, soccer, multiple teams)

Tibia Stress Fracture



Stress Fractures - L Ext.

Femur - femoral shaft, femoral neck

- can lead to complete fracture
- neck injuries more worrisome for nonunion

Calcaneus

- tenderness more through the mid-portion of the bone
- older children than Sever's

Hip

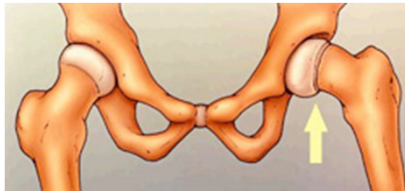
- Trochanteric Bursitis
- Osteochondrosis
- Snapping hip
 - external - IT band over greater trochanter
 - internal - iliopsoas tendon
- SCFE

SCFE

Slipped Capital Femoral Epiphysis

- Consider in children with prolonged **knee pain or hip pain**
- Growth plate of the hip slips off of the neck of the femur either gradually or acutely (**Surgical Emergency**)
- Overweight children most at risk but exists in thin patients
- AP and Frog pelvis (not individual hip) x-rays

SCFE



Acute Injuries

- Fractures - acute pain and swelling necessitates x-ray evaluation
- Sprains
 - many times a non-displaced fracture in a young patient rather than a sprain - x-ray helpful

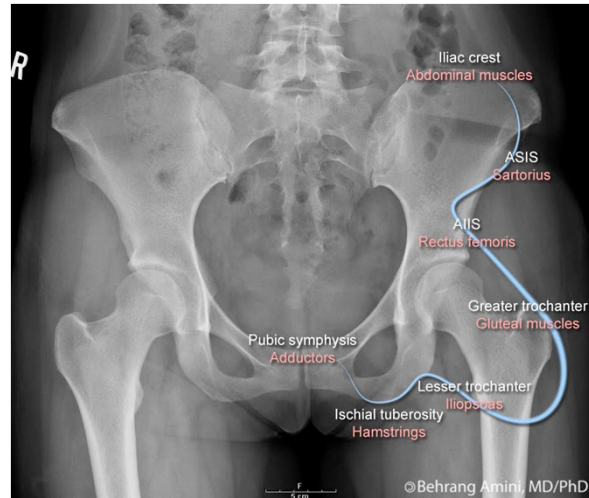
Ankle Injuries

- Younger child very possibly has a fracture of the distal fibula
- Adolescent may have either
- Older children many times have sprains

Pelvic Avulsion Fractures

- ASIS - Anterior Superior Iliac Spine (Sartorius)
- AIIS - Anterior Inferior Iliac Spine (Rectus femoris)
- Ischial tuberosity (Hamstrings)
- Many times sprinting injuries - acceleration or deceleration

Pelvic Avulsions



Exacerbation of Anatomic Conditions

- Varus - bowlegs
- Valgus - knock knees
- Rotational malalignment
- Flat Feet

Flat Feet - Flexible

- Recreates the arch and heel varus (inward turn) with tip toe rise
- A normal human foot position that sometimes causes discomfort
- OTC orthotics, custom orthotics, activity modification and rarely surgery

Flat Feet - Rigid

- Can present as multiple recurrent ankle sprains due to altered foot mechanics
- Usually associated with tarsal coalition (congenital fusion of 2 or more bones of the foot)
- Arch and heel varus NOT restored on toe rise
- X-rays, activity restr. for symptoms, occasionally surgery

Multi-Sport Athletes

- At risk for stress fractures and all of the above overuse injuries
- Same sport - multiple teams
- Any prolonged pain should be examined by a physician with radiographs

Vitamin D

- Especially important in the setting of a stress fracture
- Insufficiency being detected more often not only in sunlight deficient climates
- Low vitamin-D predisposes to acute and stress fractures, delayed healing

Vitamin D Recs

- American Academy of Pediatrics
 - Ages 9-13
 - Calcium 1300 mg/d (limit 3000)
 - Vitamin D 600 IU/d (limit 4000)

Femal Athletic Triad

- Energy Deficiency with or without eating disorder
- Menstrual disturbances/amenorrhea
- Bone loss/osteoporosis

Pearls

- Any prolonged pain or pain that is prohibiting normal activity needs further work-up
- Most conditions are identified with a careful History and Physical Exam
- Several are easily diagnosed on X-Ray

Pearls

- Don't increase mileage and speed in the same week.
- Consider amount of running in other sports
- Consider the hip in patients with prolonged knee complaints (SCFE)
- Most patients need education and stretching or activity modification

References

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