

- 1 **Running Injuries in Children and Adolescents**
 - Cook Children's SPORTS Symposium
 - July 2, 2014
- 2 **Running Injuries**
 - Overuse injuries
 - Acute injuries
 - Anatomic conditions
- 3 **Overuse Injuries**
 - Pain that cannot be tied to an acute event
 - Swelling
 - Changes in form or technique
 - Decreased interest in practice
- 4 **Overuse Injuries**
 - Osteochondroses
 - Tendinitis
 - Stress reaction
 - Exacerbation of anatomic condition
 - Idiopathic anterior Knee pain
- 5 **Osteochondroses**
 - Osgood-Schlatter's - tibia tubercle
 - Sever's - calcaneal apophysis
 - Van Neck's - ischium
- 6 **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
- 7 **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
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- 9 **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)
- 10 **Tendinitis**
 - Quadriceps/Patellar tendon
 - Pes anserine (hamstrings)

- Achilles
- Flexor Hallucis, Peroneals, Tibialis Posterior
- No x-ray changes

11 **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

12 **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

13 **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

14 **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

15 **Stress Fracture**

Common Sites

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

16 **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)

17 **Tibia Stress Fracture**

18 **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

19 **Hip**

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

20 **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

21 **SCFE**22 **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

23 **Ankle Injuries**

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

24 **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

25 **Pelvic Avulsions**26 **Exacerbation of Anatomic Conditions**

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

27 **Flat Feet - Flexible**

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- 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

28 **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

29 **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

30 **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

31 **Vitamin D Recs**

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

32 **Femal Athletic Triad**

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

33 **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

34 **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

35 **References**

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