Pediatric Overuse Sports Injuries

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Disclosure

• Neither I, Holly J. Benjamin, nor any family member(s) have any relevant financial relationships to be discussed, directly or indirectly, referred to or illustrated with or without recognition within the presentation.
Objectives

• Discuss risk factors for pediatric overuse sports injuries
• Define burnout
• Briefly discuss high risk overuse injuries seen in soccer
• Identify strategies for overuse injury prevention
Epidemiology

• >30 million children participate in organized sports*
• >7.3 million H.S. students participate in athletics**
• H.S. athletics result in >2 million injuries annually***
  • 500,000 doctor visits
  • 30,000 hospitalizations
• >3.5 million children under age 14 are treated annually for sports injuries; many are already specialized*
• Overuse injuries account for half of all sports injuries in middle school and high school*
• Tracking injuries is difficult, reporting mechanisms lacking

*Safe Kids USA
** National Federation of State High School Associations
*** Centers for Disease Control
Burnout: hallmark is loss of enjoyment in sport participation coupled with poor performance

• 2.2% high school girls & 2.0% boys get college scholarships; 6% will play sports

• >70% of H.S. athletes quit organized sports by age 15

• 0.2-0.5% of HS athletes ever make it to the professional level

• Highest transfer or dropout in NCAA is women’s soccer
Changing landscapes of sports

Agency sponsored

Club sports

Recreational sports

Intramural sports

Interscholastic sports
Factors contributing to overuse injuries

- Genetics
- Biomechanics
- Workload

Ref: Reider; Sports Medicine and the School Age Athlete
Overuse tendonopathy model

Fig. 3. Schematic illustration of pain and tissue damage in overuse tendinopathy. Tendon pathology may begin well before symptoms arise; therefore, recovery may take months, even in patients who present with recent-onset symptoms (reproduced from Leadbetter,[80] with permission).

Risk factors for overuse injury*

- Growth related factors
  - Susceptibility of growth cartilage to repetitive stress
  - Adolescent growth spurt
- Other intrinsic factors
  - Previous injury
  - Previous level of conditioning
  - Anatomic factors
  - Triad/RED-S (energy imbalance
  - Psychological and developmental factors

- Extrinsic factors
  - Training progression
  - Overscheduling
  - Inappropriate equipment/footwear
  - Improper sport technique
  - Psychological factors-adult and peer influences

*Difiori JP, Benjamin HJ, et al. Overuse injuries and burnout in youth sports. CJSM. 24(1), 2014*
Key points to successfully treating overuse injuries

• Make an accurate diagnosis
• For every injury (victim) there are underlying causes (culprits) – not really just “overuse”
• REST and NSAIDS (ibuprofen, Naprosyn, etc.) NEVER really heal an injury properly
• Proper rehabilitation addressing genetics, biomechanics and workload is the key
Victims and Culprits

• Soccer player or runner with anterior and lateral knee pain
  • Victim = knee
  • Culprit = tight IT band; weak glut. muscle

• Soccer player with heel pain and achilles tendonitis
  • Victim = overstretched Achilles
  • Culprit = cleats, old shoes, flat feet, growth spurt
When to get imaging or refer

• **Medical advice:**
  - Pain > 3 weeks
  - Night-time pain, tingling or numbness, joint swelling
  - Acute trauma
  - Progressive limitations in sport performance

• **Imaging:**
  - Xrays: bony anatomy
  - MRI: look beyond the bone
## High risk overuse injuries soccer

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>SYMPTOMS</th>
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<tbody>
<tr>
<td>Hip pain</td>
<td>Groin pain with weight-bearing, + hop test, pain with rotation</td>
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<tr>
<td>Femoral neck stress fx = high risk</td>
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<tr>
<td>Labral tear, sports hernia</td>
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<tr>
<td>Tibia pain</td>
<td>Reproducible bony tenderness (local = stress fx); tightness, pressure, cramping in legs (think comp. synd)</td>
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<td>Stress fractures</td>
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<tr>
<td>Exertional compartment syndrome</td>
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<tr>
<td>Foot pain medial (inside) foot</td>
<td>vague, midfoot pain, possibly migratory, arch pain, bony pain</td>
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<tr>
<td>Navicular stress fracture</td>
<td></td>
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<tr>
<td>Foot pain lateral (outside foot)</td>
<td>Vague lateral foot pain, can be confused with ankle sprains, both acute and overuse occur</td>
</tr>
<tr>
<td>Jones fracture (5&lt;sup&gt;th&lt;/sup&gt; metatarsal)</td>
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Pearls for prevention

• AAP recommendations: amounts of “safe” exercise for children/adolescents is somewhat individualized*

• In general exercise limits include
  - Up to 5 days per week
  - 2-3 months off per year from sport
  - Cross-training permitted
  - Strength training and flexibility 2-3d per week—emphasis on core
  - Limit increases in exercise to 10% per week with reasonable maximums
  - Participate on only 1 team per season (that is more for multiple teams same sport—no data on multiple sports except raises risk for overtraining syndrome

Prevention of overuse injuries

- Reverse the patterns of early sports specialization (meaning promote sport diversification, late specialization)
- Education of coaches, ATC’s, athletes and parents among others; follow rules & safety guidelines
- Encourage healthy lifestyles—nutrition, sleep & recovery
- Promote balanced training—5 d/wk; 2-3 months of rest per year; repetition limits where applicable
- Flexibility & strength training programs should be incorporated
- Screen for injury, overtraining & burnout—athlete happiness, work ethic & performance
- See a physician for suspected injuries, especially in high risk athletes

Thank-you!