Pediatric Ankle Sprains
What to watch for!

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Epidemiology

• 41% (521) of all musculoskeletal injuries come from sports; responsible for 8% (495/6173) of all ED visits
• mean age 12.2 years
• Sprains, contusions, and fractures were the most common injury types (34, 30, and 25%, respectively)

Patterns in childhood sports injury.
Damore DT, Amerongen R et al.

Epidemiology

• Female Versus Male
  – sprains (44% vs 36%)
  – contusions (37% vs 33%)
  – fractures (22% vs 31%)

Patterns in childhood sports injury.
Damore DT, Amerongen R et al.
Soft Tissue Injuries

• 95% of sports injuries
• Ligament sprains and muscle-tendon strains – 2/3
• Contusions 10 to 15%
• Lacerations 2 to 3%
• Fractures 5%

Most Common Injury

• What is a sprain?
  – A sprain is a wrenching or twisting or tearing injury to a ligament.

Most Common Injury

• What is a strain?
  – A strain is an injury to a muscle or tendon, and is often caused by overuse, force, or stretching.
Differential Diagnosis Acute Ankle Injury

- Sprained ankle
- Physeal fractures
- Osteochondral fractures
- Lateral process fractures of the talus or calcaneus
- Fracture base of the fifth metatarsal/ apophyseal region
- Fracture fifth metatarsal at the metaphyseal-diaphyseal junction (Jones fracture)
- Peroneal tendon subluxation/dislocation
- Calcaneocuboid joint sprain
Table 1. The West Point Ankle Sprain Grading System

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Grade 1</th>
<th>Grade 2</th>
<th>Grade 3</th>
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<tbody>
<tr>
<td>Location of tenderness</td>
<td>ATFL</td>
<td>ATFL, CFL</td>
<td>ATFL, CFL, PTFL</td>
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<tr>
<td>Swelling &amp; Ecchymosis</td>
<td>Slight, localized</td>
<td>Moderate, localized</td>
<td>Significant, diffuse</td>
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<tr>
<td>Weight bearing ability</td>
<td>Full weight bearing, Partial WB</td>
<td>Difficult without crutches, impossible without pain</td>
<td></td>
</tr>
<tr>
<td>Ligament damage</td>
<td>Stretched</td>
<td>Partially torn</td>
<td>Completely torn</td>
</tr>
<tr>
<td>Instability</td>
<td>None</td>
<td>None - slight</td>
<td>Definite</td>
</tr>
</tbody>
</table>

Exam

• Palpatory Exam provides the most information

Ankle Provocative Tests

• Anterior drawer test—compare laxity to other side
Ankle Provocative Tests

• Talar Tilt Test - 5 – 26 degrees can be normal range, always compare to other side

Ankle Provocative Tests

• External Rotation Stress Test of the Syndesmosis and Squeeze test - externally rotate the foot with the ankle in plantarflexion

When to Consider an Xray

• Inability to bear weight both immediately after the injury and in the Emergency Department.

• Bony tenderness over the posterior edge, tip or distal 6 cm of the lateral malleolus.

• Bony tenderness over the posterior edge, tip or distal 6 cm of the medial malleolus.

• Tenderness over the base of the 5th metatarsal.
What to Watch for?

• Sprain versus Physeal fracture
  – Tenderness over a growth plate = fracture = immobilization

What to Watch for?

• Maissoneuve Fracture

What to Watch for?

• Foot Apophysitides
  – Sever’s Disease
  – Navicular Apophysitis
What to Watch for?
Osteochondral Defect Talus

What to Watch for?

- Sever’s Disease
  - classically described as causing heel pain in older children, just prior to fusion of the calcaneal apophysis (between ages 12-15 yrs)

What to Watch for?

- Sever’s Disease
  - radiographic fragmentation of the apophysis correlated with the patient’s symptoms?
  - fragmentation of the apophysis is a normal finding
  - Comparison views
What to Watch for?

• Hypersensitive pain reaction- acts like Reflex sympathetic dystrophy

Goals of Treatment and Followup

• Appropriately rest injury (brace, splint, cast)
• range of motion must be restored completely
• Muscle strengthening after immobilization
• restore, facilitate, or develop proprioception in the ankle joint
• Avoid common complications of recurrence, prolonged pain, and ankle instability

Treatment

• P.R.I.C.E.
  – Protection (2 approaches)
  – Rest
  – Ice - ice the area immediately, ice pack or slush bath for 15 to 20 minutes each time and repeat every two to three hours while you're awake for the first 48 to 72 hours
  – Compression
  – Elevation
• Rehabilitation- home exercises vs. therapy
Ankle Brace

Treatment- Posterior Mold Splint - Short leg Walker-Cast

Caution!
Treatment Options

- Immobilization that allows movement until healing has taken place (3-6 weeks) because the collagen fibers heal the fastest and orient along the lines of force where protected movement occurs.
- Early movement also helps in decreasing swelling and the danger of fibrosis that normally develops in chronic swelling.


Treatment Options

- The Collaborative Ankle Support Trial (CAST) in the United Kingdom randomized, controlled trial
  - compared the clinical effectiveness and cost-effectiveness of below-knee cast, Aircast brace, Bledsoe boot and a double-layer tubular compression bandage.
  - 3 months, the below-knee cast was shown to provide an advantage in terms of overall recovery (pain, activities of daily living, sports participation); the Aircast provided minimal advantage; and the Bledsoe boot provided no significant advantage.


Prevention

- Short-term protection
  - Taping or bracing while you're recovering from injury and when you're first getting back into your regular activities.
- Long-term protection
  - work to strengthen and condition the muscles around the joint that has been injured.
  - The best brace you can give yourself is your own "muscle brace."
Prevention

- Taping
  - 10% increase in maximal resistance to inversion moments
  - after ~40 minutes of vigorous exercise, tape provides insignificant levels of protection

- Bracing
  - semirigid braces resulted in a significant reduction in injury compared to unbraced athletes

Treatment-Theraband Exercises

Thera-Band strengthening exercises for the lower leg

Wobble Board Exercises

Wobble board exercises A, B, C, D, E
Who Needs Therapy?

- Most grade 3 sprains, some grade 2
- Unable to perform home exercises
- Recurrent sprains
- Chronic Pain
- Hypersensitive pain reaction- acts like Reflex sympathetic dystrophy

Conclusion

- History will elicit the mechanism of injury and provide valuable clues as to the ligamentous structures that may be injured
- Consider the differential diagnosis of the acutely injured ankle to exclude a serious injury that may mimic an ankle sprain
- After pain and swelling are controlled, rehabilitation concentrates on increasing pain-free motion while beginning exercises to prevent loss of strength