Sports Injuries of the Foot and Ankle

Dr. Travis Kieckbusch
August 7, 2014
Foot and Ankle Injuries in Athletes

• Lateral ankle sprains
• Syndesmosis sprains “high ankle sprain”
• Achilles tendon injuries
• Lisfranc injuries
• Fifth metatarsal fractures
• Plantar plate injury
Foot and Ankle Injuries in Athletes

- Lateral ankle sprains
- Syndesmosis sprains “high ankle sprain”
- Achilles tendon injuries
- Lisfranc injuries
- Fifth metatarsal fractures
- Plantar plate injury
Lateral Ankle Sprains

• Most common injury in sports
  • Mechanism of injury is inversion
  • Injury to ATFL and CFL most commonly
    • Lateral ankle ligaments
    • Deltoid (medial) involved in more severe cases
  • Significant variability in severity
Ankle Ligaments

Lateral view (outside of ankle)

Fibula (outer bone)

Tibia (shinbone)

Talus

Anterior talofibular ligament

Posterior talofibular ligament

Calcaneofibular ligament

Deltoid (medial) ligament of ankle

Posterior tibiotarsal ligament

Tibiocalcaneal ligament

Anterior tibiotarsal ligament

Tibionavicular ligament

Medial view (inside of ankle)

Calcaneus (heel bone)

Sprained ankle: torn ligaments are common injuries in basketball.

Tibia (shinbone)

Achilles tendon (cut)
Lateral Ankle Sprains

- Most common injury in sports

Table 1

<table>
<thead>
<tr>
<th>Sport</th>
<th>Game Injuries Relating to the Ankle (%)</th>
<th>Game Injuries Relating to the Foot (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men’s baseball⁰</td>
<td>7.4</td>
<td>0</td>
</tr>
<tr>
<td>Women’s softball⁰</td>
<td>10.3</td>
<td>0</td>
</tr>
<tr>
<td>Men’s basketball¹⁰</td>
<td>26.2</td>
<td>2.6</td>
</tr>
<tr>
<td>Women’s basketball¹¹</td>
<td>24.6</td>
<td>2.4</td>
</tr>
<tr>
<td>Men’s football¹²</td>
<td>15.6</td>
<td>1.1</td>
</tr>
<tr>
<td>Men’s lacrosse¹³</td>
<td>11.3</td>
<td>0</td>
</tr>
<tr>
<td>Women’s lacrosse¹⁴</td>
<td>22.6</td>
<td>1.3</td>
</tr>
<tr>
<td>Men’s soccer¹⁵</td>
<td>18.8</td>
<td>4.2</td>
</tr>
<tr>
<td>Women’s soccer¹⁶</td>
<td>19.4</td>
<td>2.7</td>
</tr>
</tbody>
</table>
Lateral Ankle Sprains

- Physical exam
  - Swelling and ecchymosis laterally
    - Possibly medially as well
  - Limited motion
  - Tenderness over ATFL, CFL
  - Variable ability to bear weight
Ottawa Ankle Rules

a) An ankle x-ray series is only required if there is any pain in malleolar zone and any of these findings:
1. Bone tenderness at A
   OR
2. Bone tenderness at B
   OR
3. Inability to bear weight both immediately and in ED

b) A foot x-ray series is only required if there is any pain in midfoot zone and any of these findings:
1. Bone tenderness at C
   OR
2. Bone tenderness at D
   OR
3. Inability to bear weight both immediately and in ED
Lateral Ankle Sprains

- **Treatment**
  - Most treated non-operatively
    - Brace/splint until pain tolerable
    - Edema control
  - Most important is rehabilitation including proprioception
    - Most common cause of recurrent sprain is failure to rehab correctly
Lateral Ankle Sprains

• Treatment

• Operative treatment for chronic instability following injury

• No indication for acute surgery
  • Beware of lateral process talar fracture in lateral ankle sprain that won’t resolve
Lateral Ankle Sprains

• Treatment

• Operative treatment for chronic instability following injury
Lateral Ankle Sprains

- Operative treatment for chronic instability following injury
  - Anatomic repair is procedure of choice for athletes
    - Brostrom repair
  - Nonanatomic repair significantly changes hindfoot biomechanics
    - Newer reconstructions using allograft as yet unproven
Lateral Ankle Sprains

- Anatomic repair is procedure of choice for athletes
  - Brostrom repair
Lateral Ankle Sprains

- Anatomic repair is procedure of choice for athletes
  - Brostrom repair
Lateral Ankle Sprains

• Anatomic repair is procedure of choice for athletes
  • Brostrom repair
  • Post operative course
    • NWB 4-6wks
    • Gentle ROM
    • No impact 4 months
“Snowboarder’s Ankle”

- Fracture of the lateral process of the talus during landing
- Ankle forced into dorsiflexion and inversion
- Can be difficult to see on regular ankle x-ray series
- Consider if proper mechanism or in ankle sprain that does not resolve
“Snowboarder’s Ankle”

- Mortise view in plantar flexion
  - 20-25 degrees of internal rotation
  - Lateral process in profile, will flex the forefoot out of the way

- Non-operative treatment if minimal displacement

- Surgery for displaced or unstable fractures
  - High association of other hind foot injuries
Foot and Ankle Injuries in Athletes

- Lateral ankle sprains
- Syndesmosis sprains “high ankle sprain”
- Achilles tendon injuries
- Lisfranc injuries
- Fifth metatarsal fractures
- Plantar plate injury
Syndesmosis Sprain

• AKA “High ankle sprain”
  • Injury to tibial fibular ligaments
  • More severe than lateral ankle sprain
  • Generally external rotation force causing injury
  • Can disrupt mortise-unstable
  • Longer time to recovery
High Ankle Sprain

Syndesmosis Injury
 Syndesmosis Sprain

• Physical exam
  • Severe swelling
  • Tenderness over syndesmosis
  • Can have deltoid ligament tenderness
  • Must evaluate proximal fibula for possible fracture
    • Maisonneuve injury

Pain with passive external rotation
Syndesmosis Sprain

• Evaluation
  • Must have X-rays
  • High level of suspicion for mortise disruption
    • If any doubt should have external rotation stress view
Syndesmosis Sprain

- Must have X-rays

Ankle radiographic parameters. A, Normal syndesmotic relationships include a tibiofibular clear space (open arrows) <6 mm in both the AP and mortise views, as well as a tibiofibular overlap (solid arrows) >6 mm or >42% of the width of the fibula on the AP view, or >1 mm on the mortise view. The overlap is measured 1 cm proximal to the plafond. B, AP radiograph demonstrating a widened syndesmosis and increased medial clear space. (Panel A reproduced from Stephen D: Ankle and foot injuries, in Kellam JF, Fischer TJ, Tometta P III, Bosse MJ, Harris MB, eds: Orthopaedic Knowledge Update: Trauma 2. Rosemont, IL, American Academy of Orthopaedic Surgeons, 2000, p 210.)
Syndesmosis Sprain

- Treatment
  - Syndesmosis stable
    - Boot until pain free
    - Progress as tolerated in therapy
    - Can be up to 8 wks to recover
  - Syndesmosis unstable
    - To OR for fixation
Syndesmosis Sprain

- Syndesmosis unstable
  - To OR for fixation
Foot and Ankle Injuries in Athletes

• Lateral ankle sprains
• Syndesmosis sprains “high ankle sprain”
• Achilles tendon injuries
• Lisfranc injuries
• Fifth metatarsal fractures
• Plantar plate injury
Achilles Tendon Injuries

- Spectrum from acute strain to chronic irritation to rupture
- Discuss Achilles tendon rupture
- Other topics are a complete talk by themselves
Achilles Tendon Rupture

- More common in older athletes
  - Especially weekend warriors
- Jumping or high energy plantar flexion
- Occasionally forced dorsiflexion
  - Falling off a step
- Patient generally feels it tear
Achilles Tendon Rupture

• Physical exam
  • Severe swelling and ecchymosis
  • Sometimes palpable gap
  • Thompson test
  • Gravity equinus test
  • Generally unable to bear weight
Achilles Tendon Rupture

- Evaluation
  - If any doubt get an MRI
  - Some facilities using ultrasound
    - Not as reliable due to observer variance
Achilles Tendon Rupture

• Treatment
  • Generally recommend operative treatment
    • Higher return of strength and function
    • Needs to be done within 2 weeks of injury
  • Non-operative treatment in cast is possible
    • Unable to return to sports
Achilles Tendon Rupture

• Treatment
  • Functional rehab
    • Newer method of nonoperative treatment
    • Early good results in literature
      • Don’t describe how to do it
      • Say it should only be done at places very familiar with technique
  • See in 2-3 years
Foot and Ankle Injuries in Athletes

• Lateral ankle sprains
• Syndesmosis sprains “high ankle sprain”
• Achilles tendon injuries
• Lisfranc injuries
• Fifth metatarsal fractures
• Plantar plate injury
Lisfranc Injuries

- Disruption of the joint between the medial cuneiform and the second metatarsal base
  - Key to stability of the midfoot
  - Very disabling injury if it is missed
- Forced plantar flexion injury
- Sports variety can be very subtle
Lisfranc Injuries

Am Fam Physician. 1998 Jul 1;58(1):118-124
Lisfranc Injuries

• Physical exam
  • Very swollen and tender over midfoot
  • Initially unable to bear weight
  • Pain with forefoot rotation
  • Pain with palpation at base of second metatarsal
Lisfranc Injuries

• Evaluation
  • Initial X-rays to rule out fracture
    • May be missed on initial films
  • If suspicious must have either weight bearing AP of both feet or MRI
    • Look for widening of space between 2nd metatarsal base and medial cuneiform
    • Compare it to non-injured foot
  
On MRI can see the Lisfranc ligament is torn
Lisfranc Injuries

- Initial X-rays
Lisfranc Injuries

- Weight bearing X-rays
Lisfranc Injuries

- Some are easier to identify than others!
Lisfranc Injuries

• Treatment
  • Initially splinting and edema control
  • Generally recommend operative treatment
    • Reduction of joint and screw fixation
  • Very disabling injury if missed
    • Chronic instability treated with joint fusion
Lisfranc Injuries

- Treatment
Lisfranc Injuries

• Treatment
Lisfranc Injuries

• Treatment
Lisfranc Injuries

- Treatment
  - Newer information regarding fixation and healing versus fusion of midfoot joints.
    - Improved outcome with fusion
    - No info in athletes
      - Out 6-9 months with fusion
Foot and Ankle Injuries in Athletes

- Lateral ankle sprains
- Syndesmosis sprains ‘high ankle sprain’
- Achilles tendon injuries
- Lisfranc injuries
- Fifth metatarsal fractures
- Plantar plate injury
Fifth Metatarsal Fractures

• Athletes generally sustain injuries to the base of the 5th metatarsal
  • Avulsion fractures
  • Jones fractures
Fifth Metatarsal Fractures

- Avulsion fractures
  - Inversion injury
  - “Severe” ankle sprain
Fifth Metatarsal Fractures

• Avulsion fractures
  • Physical exam
    • Mild edema and ecchymosis
    • Tender at base of 5th MT
    • Lateral ankle pain as well
    • Usually can bear weight
Fifth Metatarsal Fractures

- **Avulsion fractures**
  - Plain X-rays adequate
  - Most are minimally displaced
  - Can be confused with developing apophysis
    - Oblique orientation
    - Normal finding
      - Girls age 9-11
      - Boys age 11-14
  - No treatment
Fifth Metatarsal Fractures
Fifth Metatarsal Fractures

- Avulsion fractures
  - Treatment
    - Minimally displaced
      - Boot immobilization for 4-6 weeks
    - Displaced
      - Operative fixation
Fifth Metatarsal Fractures

• Jones Fracture
  • Stress fracture of proximal metaphysis of the metatarsal
    • Recurrent overuse injury
  • Generally single event when bone fractures
  • Often patient has been having pain for long period of time
Fifth Metatarsal Fractures

• Jones fracture
  • Physical exam
    • Minimal edema and ecchymosis
    • Tenderness at base of 5th MT
  • Can bear weight
Fifth Metatarsal Fractures

• Jones fracture
  • Evaluation
    • X-rays
      • Fracture through the metaphysis
      • More distal than avulsion fracture
      • Thickening of cortex from repetitive stress
Jones Fractures
Fifth Metatarsal Fractures

• Jones Fracture

  • Treatment

    • Weekend warrior

      • Boot immobilization for 8-12 weeks
      • Can be difficult to get to heal
      • Question regarding weight bearing status during treatment

        • I keep mine non-weight bearing
Fifth Metatarsal Fractures

- Jones Fracture
  - Treatment
    - High level athlete
      - Recommend operative fixation
    - Return to play when wound healed and pain tolerable
    - Can take 4-6 months to heal
Foot and Ankle Injuries in Athletes

- Lateral ankle sprains
- Syndesmosis sprains “high ankle sprain”
- Achilles tendon injuries
- Lisfranc injuries
- Fifth metatarsal fractures
- Plantar plate injury
Plantar Plate Injuries

• AKA “Turf Toe”
  • Hyperextension injury to 1st MTP joint
  • Most common on artificial playing surfaces with flexible shoes
  • Can significantly limit playing ability
Plantar Plate Injuries

• Physical exam
  • Pain and swelling 1\textsuperscript{st} MTP
  • Variable amount of ecchymosis
  • Pain with passive dorsiflexion of toe
  • Difficulty with push off when walking
Plantar Plate Injuries

• Evaluation
  • Should have plain X-rays
    • Evaluate position and possible fracture of sesamoids
Plantar Plate Injuries

• Treatment
  • Symptom control initially
    • May need to be immobilized
  • Progress activity as tolerated
    • Rigid orthotic will help symptoms
    • Can take 2-3 months to resolve
Plantar Plate Injuries

- Treatment
  - Surgical intervention for complete disruption of plantar plate with:
    - Proximal migration of sesamoids
    - Severe fracture of sesamoids that won’t heal
Plantar Plate Injuries

• Surgical treatment
  • One medial and one plantar incision
  • Direct repair of plantar plate
  • May do partial excision of fractured sesamoid
Plantar Plate Injuries

- Surgical treatment
  - Return to full activity at 4-6 months
  - May never fully recover
  - Limit push off strength
Questions?