Foot and Ankle Injuries in the Athlete

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Disclosures

None
# Foot and Ankle Injuries in NCAA Athletes 1988-2004

<table>
<thead>
<tr>
<th>Sport</th>
<th>Game Injuries Relating to the Ankle (%)</th>
<th>Game Injuries Relating to the Foot (%)</th>
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</thead>
<tbody>
<tr>
<td>Men’s baseball</td>
<td>7.4</td>
<td>0</td>
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<tr>
<td>Women’s softball</td>
<td>10.3</td>
<td>0</td>
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<td>Men’s basketball</td>
<td>26.2</td>
<td>2.6</td>
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<tr>
<td>Women’s basketball</td>
<td>24.6</td>
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<tr>
<td>Men’s football</td>
<td>15.6</td>
<td>1.1</td>
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<td>Men’s lacrosse</td>
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<tr>
<td>Women’s lacrosse</td>
<td>22.6</td>
<td>1.3</td>
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<tr>
<td>Men’s soccer</td>
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</tr>
<tr>
<td>Women’s soccer</td>
<td>19.4</td>
<td>2.7</td>
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</table>

*NCAA Injury Surveillance System data*
Outline

1. Inversion ankle sprains
2. High ankle sprains
3. Turf toe
1. Inversion Sprains
Inversion Sprains

• May be the MOST common injury in sports – 16-21%*
• Strongest risk factor – history of ankle sprain
• Mechanism
  – Foot inversion or adduction with ankle in a plantarflexed position
  – Often associated with running, jumping activities

* Maehlum et al
Pathoanatomy

• Osteology
• Lateral ligamentous complex
  – ATFL, CFL, PTFL
• ATFL injury is most common
  – Midsubstance
  – Sometimes with CFL rupture
• Results in Biomechanical/Neuromuscular/Proprioceptive Deficits
  - Decreased proprioception in pts with chronic ankle instability*
  - Higher incidence of inversion ankle injury in athletes with lower dorsiflexion:plantarflexion ratios^

*Williams et al
^Baumhauer et al
Presentation

• Symptoms
  – Lateral pain, swelling, ecchymosis, sensation of instability

• Physical Exam
  – Inspection
  – Palpation
  – Drawer testing
Imaging

• Radiographs – Ottawa Rules
  – AP, lateral, mortise
  – Stress views?
    • Talar tilt and anterior drawer lateral

• MRI
  – Most sensitive and specific for soft tissues, cartilage lesions
Differential Diagnosis and Associated Injuries

- Peroneal tendon tears or instability
- Intraarticular pathology such as an osteochondral lesion of talus
- Subtalar injury/instability
- Syndesmosis injury
Classification

• Clinical Severity
• Number of Ligaments Injured
• Strain → Partial Tear → Complete Tear
• Stable vs unstable
  – Based upon severity of symptoms, exam
  – Guides treatment and timeline
Treatment

• Nonoperative is first line
  – 75-100% good results in literature whether treated operatively or non-operatively
• Functional rehab for athletes
  – RICE
  – Weightbearing as tolerated with crutches
  – Minimal immobilization
  – ROM and strengthening (especially evertors and proprioception) – timing of therapy and return to sport both dependent upon severity of injury and symptoms
Timeframe

• The athlete with a severe injury or who cannot tolerate therapy – immobilize! (<10 days)

• **Immobilization vs functional treatment for unstable inversion sprains** – when compared to cast immobilization for 3 weeks, functional treatment (bracing and ROM as tolerated) resulted in quicker return to play and less symptoms at 3 and 6 months based upon recent studies (no diff at 12 mo)*

*Ardevol et al
Prevention

• Strengthening
  – Fully activated strong evertors exceed taping, orthoses, or high top shoes in stabilizing against inversion injury*

• Taping
  – Improves proprioception^

• Bracing
  – Decreased incidence of ankle sprains in athletes in several studies

*Ashton-Miller et al
^Robbins et al
Surgery for acute unstable sprains?

• **Generally not recommended** as good results are usually obtained with nonoperative tx

• Some authors have recommended surgery for unstable acute injuries due to slightly lower rates of long-term instability and reinjury*

• We can’t predict who will fail non-op treatment

• Pijnenberg et al
Recurrent ankle sprains/
Chronic instability

- Incompetent ligamentous complex
- Neuromuscular conditions
- Tarsal coalition
Lateral ligamentous stabilization

- Open procedure to stabilize ankle through repair or reconstruction of ankle ligaments
- Requires period of immobilization
  - Usually 4-6 weeks
Intraarticular Pathology

- Osteochondral defects
- Loose bodies
2. High Ankle Sprains (Syndesmotic Injuries)
Incidence

- 10-20% of ankle sprains overall*
- More common in football and hockey

*Amendola
Pathoanatomy
Mechanism

- External rotation of the foot
- Causes injury to ligaments between tibia and fibula
Presentation

• Symptoms
  – Pain with weightbearing

• Physical Exam
  – Tender anteriorly between tibia and fibula
    • ‘tenderness length’
  – Tests
    • External rotation test*
    • Squeeze test
Imaging

• Radiographs
  – Should be obtained for all patients with suspected syndesmotic injury
  – Widening may be present
    • >6mm tib-fib clear space on AP*
  – Avulsion fractures in up to 50%

• Stress Radiographs

• MRI
  – 100% sensitive, 93% specific for AITFL injury (confirmed arthroscopically)^

*Harper   ^Takao
Classification

- Type I – sprain without diastasis
- Type II – sprain with latent diastasis
- Type III – frank diastasis

- Increasing severity and classification guides treatment!
Treatment

- **Type I – sprain with no diastasis** – no widening on static or stress films
  - Stable injuries, treat symptomatically, and with functional rehab
  - Take about twice as long as a lateral ankle sprain
  - Taylor et al – 1/3 of patients reported some chronic stiffness and 1/4 had some chronic activity-related pain
Treatment

• **Type II – latent diastasis** - widening on stress films but no widening on static films
• CT or MRI to confirm syndesmosis alignment
• 3-4 weeks nonweightbearing in a cast
• 1-2 weeks of progressive weightbearing followed by radiographs to ensure that there has been no loss of alignment
• Followed by functional rehab
Treatment

- **Type III** — **frank diastasis** — disrupted mortise on static films
- Surgery
- 1 or 2 screws used to hold the reduced syndesmosis together
- Depending upon the associated avulsions or ligamentous injuries, this may involve arthroscopy, medial ligament repair, or open syndesmotic repair
3. Turf Toe
Mechanism

• Hyperextension injury to the first metatarsophalangeal joint (MTP)
• Axial load to a plantarflexed ankle
• 1990 Survey showed 45% of NFL players had experienced a turf toe injury*
• Underappreciation of these injuries by athletes or medical providers may lead to undertreatment

*Rodeo
Anatomy

- Capsule/ligament/sesamoid complex injury – usually injury is distal to the sesamoids
- Injury ranges from a mild sprain to complete disruption of stabilizing structures
Presentation

- Pain at the great toe MTP joint, with push-off, possibly with swelling/ecchymosis
- Tender at or distal to sesamoids
- Drawer test
Imaging

- Plain films
  - Usually normal
  - Sesamoids are key
- MRI can help determine the severity of the soft tissue disruption and assess bony structures

* from Anderson, Hunt, McCormack
Classification

- **Grade I** – mild attenuation of capsuloligamentous structures, minimal edema
- **Grade II** – partial tear of capsuloligamentous structures, more edema and tenderness
- **Grade III** – complete disruption of capsuloligamentous complexes
Treatment

• **Grade I** – RICE, return to play as tolerated, consider taping, minimal days missed

• **Grade II** – RICE, partial weightbearing, ROM of toe after a few days, usually will require 2 weeks for return to play

*Rigid Orthosis*

prevents break in shoe at MTP, minimizing MTP extension
Treatment

• **Grade III** – RICE, consider immobilization with partial weightbearing, usually 6-8 weeks for full return to play

• ? Consider acute operative intervention with repair of capsuloligamentous structures

• Anderson et al described 9 high-level athletes who underwent acute repair with 7/9 returning to prior level of play
Outcomes

• Clanton et al – surveyed 20 players 5 years after turf toe injury – 50% still had activity-related pain

• Some may be minor injuries, but it’s important to identify the severe turf toe injury
Conclusion

- For foot and ankle injuries, establishing the correct **diagnosis** as well as the **severity** of the injury guides the treatment plan, the timeline for return to play, and gives the athlete a more accurate prognosis.
Thank YOU!
Sources