Common Foot and Ankle Injuries in the Football Player - Surgery or Not

Daniel Murawski, MD
April 22, 2016

Injury Rate (%): (Surgical indication)

<table>
<thead>
<tr>
<th></th>
<th>Ankle</th>
<th>Foot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collegiate</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>High School</td>
<td>18</td>
<td>3</td>
</tr>
<tr>
<td>Youth</td>
<td>15</td>
<td>4</td>
</tr>
</tbody>
</table>

Common Injuries:
- Lateral ankle sprains
- High ankle sprains
- Hallux MTPJ injury
- Fibular fracture
- Jones fracture
- Lisfranc sprains
- Medial ankle sprains


Common Injuries

<table>
<thead>
<tr>
<th>Injury</th>
<th>Grade</th>
<th>%</th>
<th>Time Loss (d)</th>
<th>Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lateral sprain</td>
<td>I</td>
<td>45</td>
<td>6/7</td>
<td>0.4%</td>
</tr>
<tr>
<td>High ankle sprain</td>
<td>II</td>
<td>17</td>
<td>12/23</td>
<td>2.8%</td>
</tr>
<tr>
<td>Medial ankle sprain</td>
<td>II</td>
<td>8</td>
<td>7/12</td>
<td>3.8%</td>
</tr>
<tr>
<td>Lisfranc sprain</td>
<td>II</td>
<td>7</td>
<td>6/20</td>
<td>5.3%</td>
</tr>
<tr>
<td>Hallux MTPJ</td>
<td>II</td>
<td>4</td>
<td>5/20</td>
<td>1.4%</td>
</tr>
<tr>
<td>Metatarsal fracture</td>
<td>II</td>
<td>2</td>
<td>38</td>
<td>35.6%</td>
</tr>
<tr>
<td>Lateral mall fracture</td>
<td>II</td>
<td>1</td>
<td>37</td>
<td>46.4%</td>
</tr>
<tr>
<td>Medial mall fracture</td>
<td>II</td>
<td>1</td>
<td>26</td>
<td>33.3%</td>
</tr>
</tbody>
</table>


Mechanisms Ligament Injury

Inherently stable in DF
Collateral ligs at risk in PF

Grades of Injury - Lateral

<table>
<thead>
<tr>
<th>Grade</th>
<th>Anatomic Injury</th>
<th>History</th>
<th>Anterior Drawer</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Stretching</td>
<td>Minimal swelling</td>
<td>Stable</td>
</tr>
<tr>
<td>II</td>
<td>Partial tearing</td>
<td>Moderate swelling</td>
<td>1+ asymmetry, firm</td>
</tr>
<tr>
<td>III</td>
<td>Complete rupture</td>
<td>Severe swelling, ecchymosis</td>
<td>Inability to walk</td>
</tr>
</tbody>
</table>
Lateral Grade III Injuries

- No treatment suboptimal
- Immobilization for 6 weeks suboptimal
  - stiffness, atrophy, loss of proprioception
- Modest advantage to surgery over early mobilization
  - recurrent sprains and sub/obj instability favor surgery
  - outcome scores and return to play are similar
- Acute repair same results as delayed repair
- Disadvantages to surgery
  - Longer recovery times, stiffness, ↓mobility, and complications

Surgery Versus Rehab

- Pijnenburg et al, JBJS (Br) 2003. Randomized
  Operative vs Functional, 8 year f/u
- 78% of both groups resumed sports

<table>
<thead>
<tr>
<th></th>
<th>Functional</th>
<th>Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>25%</td>
<td>16%</td>
</tr>
<tr>
<td>Recurrent sprains</td>
<td>34%</td>
<td>22%</td>
</tr>
<tr>
<td>Giving way</td>
<td>32%</td>
<td>22%</td>
</tr>
</tbody>
</table>

Medial Ankle Sprain

- Rarely see a deltoid injury in isolation
- Little guidance in the literature for grade III injuries in athletes

<table>
<thead>
<tr>
<th></th>
<th>Functional</th>
<th>Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>25%</td>
<td>16%</td>
</tr>
<tr>
<td>Recurrent sprains</td>
<td>34%</td>
<td>22%</td>
</tr>
<tr>
<td>Giving way</td>
<td>32%</td>
<td>22%</td>
</tr>
</tbody>
</table>

Medial Ankle Sprain

- Rarely see a deltoid injury in isolation
- Little guidance in the literature for grade III injuries in athletes

<table>
<thead>
<tr>
<th></th>
<th>Functional</th>
<th>Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>25%</td>
<td>16%</td>
</tr>
<tr>
<td>Recurrent sprains</td>
<td>34%</td>
<td>22%</td>
</tr>
<tr>
<td>Giving way</td>
<td>32%</td>
<td>22%</td>
</tr>
</tbody>
</table>

Grades of Injury - Syndesmosis

<table>
<thead>
<tr>
<th>Type</th>
<th>XR Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sprain without diastasis</td>
</tr>
<tr>
<td>2 (Latent Diastasis)</td>
<td>Diastasis on stress x-rays only</td>
</tr>
<tr>
<td>3</td>
<td>Frank diastasis without fracture</td>
</tr>
</tbody>
</table>

Stress X-rays - Syndesmosis

Type 2 Syndesmosis Injury
- MRI study of choice if x-rays equivocal
- Weight-bearing bilateral CT scan helpful
- Stress exam under anesthesia
- Controversial
  - Cast versus surgery in elite athlete
  - Quicker RTP with surgery?
  - Not substantiated by biomechanical or clinical data

Type 3 Syndesmosis Injury
- Open or percutaneous
- Number and type of fixation
- Location
- Small plate
- Clamp or no clamp
- Hardware removal

Lisfranc Injury

<table>
<thead>
<tr>
<th>Stage</th>
<th>Clinical Findings</th>
<th>Weight Bearing</th>
<th>X-rays</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>able to bear weight, cannot play</td>
<td>&lt; 2 mm diastasis 1st and 2nd met bases</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>able to bear weight, cannot play</td>
<td>2-5 mm diastasis 1st and 2nd met bases</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>cannot bear weight</td>
<td>&gt; 5 mm diastasis, loss arch height</td>
<td></td>
</tr>
</tbody>
</table>


Meyer et al. Midfoot sprains in college football players. AJSM 1994. 24 injuries. All returned to sport that year. At 31 month follow-up, 3/19 played pro football. 4/19 reported residual functional problems.

Case 1

Case 2
Hallux MTPJ Injury
- Hyperflexion injuries (sand toe)
- Hyperextension injuries (turf toe)
- Valgus or varus components

Anatomy MTPJ
- Bony anatomy → minor
- Capsuloligamentous → key
- Plantar plate, FHB, and sesamoids (plantar complex)
- Abductor and adductor hallucis
- Collateral and metatarsophalangeal ligaments

Grades - Turf Toe
- Grade 1 - stretch injury
  - Weight bear with minimal symptoms
- Grade 2 - partial tear
  - Some restriction in ROM/guarding
  - Moderate pain, swelling, impaired performance
- Grade 3 - complete tear
  - Severe ↓ ROM/ecchymosis/swelling, (+) Lachman’s
  - Proximal migration sesamoids, possible sesamoid fx, impaction metatarsal head, other varus/varus

Conservative Treatment
- RICE, boot, taping
- Equipment modification
  - Stiffer shoe
  - Steel or carbon fiber plate
  - OTC insole, reinforced forefoot
  - Custom-molded insole with Morton’s extension

Surgical Indications

- Positive Lachman’s
- Large capsular avulsion/unstable joint (MCL)
- Retraction of sesamoids, sesamoid fracture or diastasis of bipartite
- Serial examination shows instability:
  - Progressive hallux valgus (traumatic bunion)
  - Progressive retraction or diastasis of sesamoids
- Failure of conservative treatment

Outcome

- Pain, stiffness, progressive valgus or rigidus
  - 18 patients, at least 2 did not return to support
  - Surgery for capsular avulsion, sesamoid fx, or inability to jog without pain (3 wks)
- Clanton et al, FAI 1986
  - 53 of 56 athletes returned within 3 weeks
  - One required surgery for capsular avulsion
  - Unofficial f/u showed several cases arthritic change

Jones Fracture

- Tuberosity avulsion fracture
- True Jones fracture
- Diaphyseal stress fracture
- Screw fixation of Jones fractures is treatment of choice in competitive athletes

Outcome Continued

  - 20 athletes underwent surgery, 5 yr f/u
  - 50% persistent symptoms
- Anderson, TFAS 2002
  - Evaluated 19 athletes over a ten year period
  - 9 athletes underwent surgery (1 wk - 7 mo)
  - All had complete plantar plate disruption
  - 7 returned to sport

8 weeks NWB cast

- 72* - 93%** union rate
- Time to union ranges 7**- 21* weeks
- 33% refracture rate***

---

Lareau, Hsu, Anderson. Return to play in NFL players after operative Jones fracture treatment. FAI 2016.
* Clapper et al. Fractures of the fifth metatarsal... CORR 1995.
** Torg et al. Fractures... fifth metatarsal distal to the tuberosity. JBJS 1984.
Randomized Study Cast Versus Screw

<table>
<thead>
<tr>
<th></th>
<th>Nonunion</th>
<th>Refracture</th>
<th>TTU</th>
<th>RTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cast n=14</td>
<td>26%</td>
<td>11%</td>
<td>14.5</td>
<td>15</td>
</tr>
<tr>
<td>Screw n=19</td>
<td>5%</td>
<td>-</td>
<td>7.5</td>
<td>8</td>
</tr>
</tbody>
</table>


Screw Fixation

Malleolar Fractures - Surgery?
- Lateral malleolus
  - Weber A (Depends)
  - Weber B (Depends)
  - Weber C (Yes)
- Bimalleolar equivalent (Yes)
- Medial malleolar (Yes)
- Bimalleolar (Yes)

Lateral Malleolus - Surgery?
- 2-4 mm may be acceptable (A,B) if:
  - Mortise is stable
  - No excessive shortening or external rotation
- Option for surgery to allow quicker return to sport


Case 1
Bimalleolar Equivalent
- Always assess for deltoid rupture
- Some Weber B
- Essentially all Weber C
Medial Malleolar
- Surgery indicated unless completely nondisplaced

Controversial
- Directly repairing deltoid ligament in bimalleolar equivalent fractures

Summary
- Foot and ankle injuries are common in football players
- Recognize injuries that need further work up for potential surgery
- Vast majority treated without surgery
- Controversies still exist
- In some cases, early surgery can help athlete return to sport faster and safer