The Evaluation and Treatment of Ankle Instability – Getting It Right

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Disclosures

Neither I nor my spouse/partner has a relevant financial relationship with a commercial interest to disclose.
Epidemiology of Ankle Sprains

- Represent one of the most common injuries seen by healthcare providers
- Worldwide there is around 1 ankle sprain per 10,000 person-days
- Greatest risk factor for a sprain is a prior sprain
- 2 million acute sprains in the USA alone each year (Waterman et al 20120)
- Waterman’s NEISS database study found 49.3% of ankle sprains to be from athletic activity, 26.6% from fall from stairs and ground level fall only representing 6.7%.
Anatomical Considerations

- 3 Complex Articulations
  - Tibiotalar Joint
  - Tibiofibular Syndesmosis
  - Subtalar Joint

- Ligaments
  - Lateral
    - Anterotalofibular Ligament (ATFL)
    - Calcaneofibular Ligament (CFL)
    - Posterior Talofibular Ligament (PTFL)
  - Deltoid (Superficial and Deep)
  - Syndesmosis
    - AITFL, interosseous ligament, interosseous membrane, PITFL, and inferior transverse ligament
Signs/Symptoms Of Sprain

- Pain
- Trouble with Weightbearing
- Tenderness
- Significant Swelling
- Eccymosis
Mechanism: Is Reviewing Game Film Helpful?

- **Inversion**
  - Injuries of the lateral ligaments
  - More common than eversion
  - ATFL injury is most common
  - 20% are ATFL and CFL
  - PTFL injuries are rare in non-fractures

- **Eversion**
  - Deltoid ligament injuries are less common due to the robustness of the ligamentous complex

- **External Rotation (High Ankle Sprain)**
  - May lead to significant instability
  - Syndesmosis structure prevents dissociation of the tibia and fibula and also prevents posterolateral bowing of the fibula
Classification System

- Grade 1
  - Mild sprain
  - “ligaments stretch”
  - Little swelling or tenderness, no mechanical instability on exam, no loss or function

- Grade 2
  - Moderate sprain
  - Partial tearing
  - Moderate swelling, ecchymosis, tenderness. Mild to moderate instability on exam. Some loss of motion. Moderate pain with weightbearing and ambulation

- Grade 3
  - Severe sprain
  - Complete ligament rupture
  - Severe swelling, ecchymosis, tenderness and pain. Significant mechanical instability. Significant loss of function and motion. Unable to bear weight
How do I Diagnose?

- **History**
  - Patients will describe a “twisting injury” or a fall usually

- **Access to Game Film**

- **Physical Exam**
  - Inspect, palpate, determine if able to weight bear, injury specific maneuvers
  - Should document what spots are painful and try to differentiate between nearby structures
    - Lateral ligaments vs distal fibula vs peroneals
    - Deltoid vs medial malleolus vs posterior tibial tendon vs medial talar dome
    - Lateral talar dome vs anterior syndesmosis
  - Don’t miss the 5th metatarsal fracture, Achilles rupture, posterior tibial tendon rupture, proximal fibula fracture, peroneal tendon dislocation, etc
  - Standing Alignment... Is the foot cavovarus or planovalgus?
Physical Exam Pearls

- **Anterior Drawer Test**
  - Compare to contralateral, tests the ATFL ligament
  - Stabilize the tibia with one hand and apply a gentle anterior force to the heel with the foot in a neutral position (slight plantarflexion and inversion)

- **Talar Tilt Test**
  - Compare to contralateral
  - Tests the CFL ligament
  - Ankle in neutral position, the ankle is inverted. Compare to contralateral side

- **Eversion Stress Test**
  - Tests for deltoid injury
  - Stabilize tibia, roll calcaneus laterally. If pain then this suggests a deltoid injury

- **External Rotation Test**
  - Tests for syndesmotic injury
  - Knee flexed at 90 deg and ankle in neutral position. Examiner will stabilize the ankle proximal to the ankle joint and with the other hand externally rotates the foot.

- **Squeeze Test**
  - Squeeze midcalf
  - Pain indicates syndesmotic injury or concern for proximal fibula fracture

- **Syndesmosis Drawer (Shuck Test)**
  - Compare to contralateral side
  - Examiner grabs fibula between thumb and index finger, the fibula is pulled anterior and pushed posteriorly.
  - Pain or increased translation compared to contralateral side indicate syndesmotic injury
Imaging?

Fig. 6. Sites of palpation for the Ottawa ankle rules. (Adapted from Bachmann LM, Kolb E, Koller MT, et al. Accuracy of Ottawa ankle rules to exclude fractures of the ankle and mid-foot; systematic review. BMJ 2003;326:417–9; with permission.)

Fig. 7. Guidelines for ordering ankle series radiographs according to the Ottawa ankle rules. (Adapted from Bachmann LM, Kolb E, Koller MT, et al. Accuracy of Ottawa ankle rules to exclude fractures of the ankle and mid-foot; systematic review. BMJ 2003;326:417–9; with permission.)
X-Rays

- Basic weightbearing x-ray series of at minimum foot and ankle weightbearing. Consider adding in full length tibia films if concerned for proximal fibula fracture (Maissoneuve)

- Stress Radiographs
  - I always compare to “normal side”
  - Usually wait after an acute sprain until patient has a chance to do PT
  - I prefer Telios Jig which normalizes force applied. Better tolerated by patients as well compared to applying manual stress

- Views
  - Anterior Drawer (lateral view)
  - Varus Stress
  - Valgus Stress

- I personally think the external rotation x-ray is not as useful as bilateral weightbearing CT scan for evaluating the syndesmosis
MRI: Doc, I saw my MRI results and I must need surgery, my ATFL is ruptured

- Typically helpful for intra-articular pathology (fractures, edema, OCD), Achilles injuries, posterior tibial tendon injuries, peroneal tenosynovitis, syndesmosis

- Lots of people have ATFL rupture but are not dynamically unstable

- MRI image of ruptured ATFL and peroneus brevis split tear
CT Scan

- Traditionally better for fractures

- Weightbearing CT scan
  - Helpful tool for alignment of the hindfoot
  - Helpful to diagnose syndesmosis as you can compare to contralateral side
Conservative Treatment

- Immobilization
- Ice
- Compression
- Physical Therapy
  - Peroneals, gastroc
- Functional Bracing
- Taping, KT taping
- Injectables
  - Cortisone
  - PRP (Lai et al)
Surgical Treatment

- Up to 20% may fail conservative management and may require surgical treatment.

Figure 2. Construction of the anatomic Y-graft. (A) Intraoperative photograph shows the configuration of the Y-graft and skin incisions. (B) Schematic diagram of the Y-graft showing its 15-mm × 9 components and construction of each looped stem, the ligaments part (anterior talofibular ligament (ATFL) and calcaneofibular ligament (CFL)) and each tensioning thread (gray line).
Lateral Ligament Surgery

- **Brostrom +/- Gould, Karlsson**
  - Open vs Arthroscopic
    - Recent systematic review (Brown et al in Arthroscopy) suggested no long-term advantage to arthroscopic method.
    - With or Without suture brace

- **Anti-RoLL (Glazebrook et al)**
  - Open vs Arthroscopic vs Percutaneous

- **Historic Surgeries**
  - Watson-Jones- PB tenodesis fibula to talus
  - Evans: PB tenodesis to fibula
  - Chrisman-Snook- Split PB graft tenodesis to fibula and calc

- **Who Needs Concomitant Calcaneal Osteotomy or tibial osteotomy?**
  - Planovalgus, cavovarus, “Z-Foot”, early arthritis
  - Not always as simple as just soft tissue.

- **Who Needs Concomitant Peroneal Surgery?**
Should We Be Fixing Lateral Avulsion Fractures?

- Diallo et al (FAI 2018)
  - 10 patients underwent ORIF acutely
  - ATFL and CFL were found to be attached to avulsed fragment.
  - The average size was 6.3 mm (range, 4–9 mm) in width from anterior to posterior and 5.2 mm (range, 4–7 mm) in length from superior to inferior.
  - Fragment displacement increased under varus stress

- Not enough evidence to fix currently, but an area needing more research
Deltoid Surgery

- Isolated deltoid injuries are 3-4% of all ankle ligament injuries
- Most can be treated conservatively
- If left untreated, progressive valgus can form

To Reconstruct vs Repair
- Consider in combined injuries of the deltoid ligament and spring ligament with or without post tib injury
- In patients with persistent instability and poor ligament quality, consider reconstruction with autograft

- Hintermanns series of 52 patients revealed favorable results
Syndesmosis

- ESSKA-AFAS consensus panel recommends distinguishing acute isolated syndesmotic injury as stable or unstable.
  - Stable injuries should be treated non-operatively with a short-leg cast or brace
  - Unstable injuries should be managed operatively.
- The recommended clinical tests include: tenderness on palpation over the anterior tibiofibular ligament, the fibular translation test and the Cotton test. Radiographic imaging must include an AP view and a mortise view of the syndesmosis to check the tibiofibular clear space, medial clear space overlap, tibial width and fibular width.
Case #1

52 y.o. female CFO who presents with left ankle and knee pain. She had a skiing accident where she felt her ski got caught on something and she fell forward. Unfortunately her ski did not pop off and she felt like she twisted her ankle at that time. She has been able to walk but has been very painful for her. She presented to urgent care and was given an Ace wrap after x-rays.
Case #1
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Case #1
Case #2

27 y.o. female pro soccer player has had chronic deltoid ligament pain. She went up for a header 2 weeks prior to presentation and landed with increased stress on her medial ankle. She has had trouble running since this incident. Of note, she has significant hindfoot valgus. Injured medial ankle last season.
Case #2
Case #2
Case #2
Case #3

65 y.o. male who presents with Left ankle weakness. He had a twisting injury in 2015 and suffered a left anterior process calcaneus fracture. He has continued to have some intermittent weakness and pain. Recent EMG was done concerning for some peroneal neuropathy.

Pain is 0 out of 10 and is not really pain but just weakness.
Case #3
References


Questions?