

Foot and Ankle Injuries and the Importance of Rehab

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Introduction

Undergraduate – University of Florida

- B.S. – Agricultural and Biological Engineering

Medical School – University of Pittsburgh

Internship/Residency – Orlando Health

- Orthopaedic Surgery

Fellowship – University of Texas – Houston (FOARR)

- Foot and Ankle Surgery

Sarasota – Private practice

BayCare Medical Group



What does a Foot/Ankle Orthopaedist Do?

Specialized training after completing an orthopaedic surgery residency

American Orthopaedic Foot and Ankle Society

- www.aofas.org
- Founded in 1969, comprised of ~2100 orthopaedic surgeons internationally

Specialize in management of disorders of the bones, muscles, ligaments and nerves of the foot and ankle



AMERICAN ORTHOPAEDIC
FOOT & ANKLE SOCIETY.

RECONSTRUCTION • SPORTS MEDICINE • TRAUMA • TECHNOLOGY

Disclosures

Topics for Discussion

- Evaluation, management and rehabilitation of acute Achilles tendon injuries
- Evaluation, treatment and rehabilitation of lateral ankle sprains
- Evaluation and treatment of syndesmosis sprains
- Evaluation and treatment of osteochondral lesions of the talus

Learning Objectives

Participants should be able to evaluate and initiate treatment for:

Acute Achilles injuries

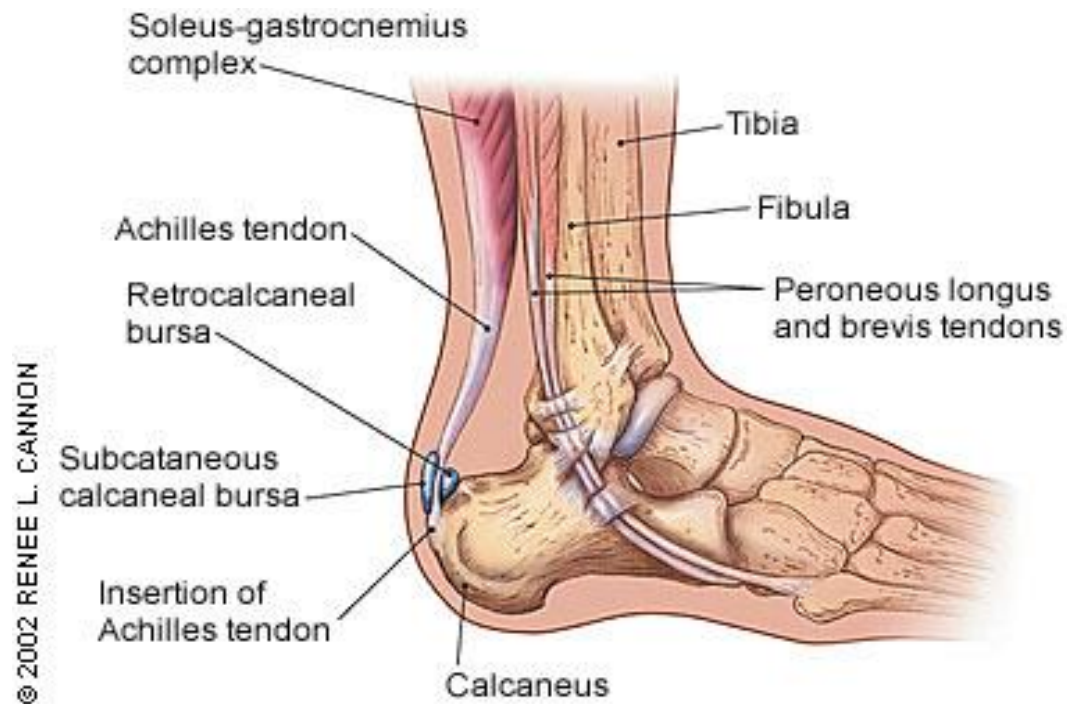
Acute lateral ankle sprains

Syndesmotic injuries

Osteochondral lesions of the talus

Achilles Injury: Anatomy

- **Confluence of gastrocnemius/soleus muscles**
- **Watershed zone with relative hypovascularity**



Common Conditions of the Achilles Tendon
Mazzone, MF, McCue, T.
Am Fam Physician. 2002 May 1;65(9):1805-1811.

Achilles Injury: History

- **Frequently 30-40yo males**
- **“Felt a pop”**
- **Forceful plantarflexion**
- **Sense of weakness, difficulty ambulating**
- **Aching or sharp pain in posterior leg**

Achilles Injury: History

- **Prodromal pain or history of Achilles injury/tendinitis**
- **Use of fluoroquinolone antibiotics**
- **Hx of steroid injections**
- **Smoking**
- **Medical comorbidities**

Achilles Injury: Examination

- **Inspection**

- Prone – evaluate resting plantarflexion
- Ecchymosis

- **Palpation**

- Palpable gap
- Thompson test
 - Squeeze calf muscle and look for foot plantarflexion
- ROM exam, strength in plantarflexion

Achilles Injury: Workup

Ankle series

3 view

- Evaluate for other injuries



Achilles Injury: Workup

Ultrasound or MRI?

- **Large study showed no need for advanced imaging if**
 - Palpable gap
 - Positive Thompson test
 - Decreased resting tension
- **No need for advanced imaging prior to orthopedic evaluation**

Garras, DN et al. "MRI is unnecessary for diagnosing acute Achilles tendon ruptures: clinical diagnostic criteria." *Clin Ortho Rel Res*, vol. 470,8 (2012): 2268-73.

Achilles Injury: Initial Management

- **Splinting in 20 degree plantarflexion**
- **Non-weightbearing**
- **Crutches, walker, rolling knee walker**
- **DVT / VTE prophylaxis?**
- **Referral to orthopaedic surgery**



Achilles Injury: DVT/VTE

- **Foot/ankle injuries generally low risk**
 - Achilles is exception (up to 36% in some studies)
- **Other DVT risk factors**
 - smoking, obesity, age >60 years, malignancy, HRT, oral contraception, previous VTE and thrombophilia
- **No consensus at this time**
 - LMWH best studied, but still no consensus

Calder, James D F et al. "Meta-analysis and suggested guidelines for prevention of venous thromboembolism (VTE) in foot and ankle surgery." *Knee surgery, sports traumatology, arthroscopy* : vol. 24,4 (2016): 1409-20.

Achilles Injury: Treatment Options

Non- Surgical

- **Functional rehab protocol**

Surgical Repair

- **Open Achilles repair**
- **Limited incision Achilles repair**

Achilles Injury: Treatment Outcomes

Traditional teaching

- **Equivalent strength op vs. non-op**
- **Increased risk of rerupture with non-op**
 - 10-40% vs 2%
- **Increased risk of wound complications with operative**

Weber M, et al. Nonoperative treatment of acute rupture of the achilles tendon: results of a new protocol and comparison with operative treatment. *Am J Sports Med.* 2003 Sep-Oct;31(5):685-91.

Khan RJ, et al. Treatment of acute achilles tendon ruptures. A meta-analysis of randomized, controlled trials. *J Bone Joint Surg Am.* 2005 Oct;87(10):2202-10.

Achilles Injury: Functional Rehab

- **Accelerated functional rehab protocol**
- **144 patients randomized to FR vs surgery**
- **2 reruptures in surgical group, 3 in FR group**
- **Similar strength, ROM**
- **Increase complications in surgical group**

Willits K, et al. Operative versus nonoperative treatment of acute Achilles tendon ruptures: a multicenter randomized trial using accelerated functional rehabilitation. *J Bone Joint Surg Am.* 2010 Dec 1;92(17):2767-75.

Achilles Injury: Decision-making

- **Location of tear**
- **Smoking/overall health status**
- **Chronicity of tear and early treatment**
- **Patient preference**

Achilles Injury: Rehab Protocol

First 2 weeks

- **Splint in plantarflexion**
- **Non-weight bearing**
 - **Ice, Elevate**

Achilles Injury: Rehab Protocol

Weeks 4 – 6

- **Cam boot with Achilles heel wedges**
 - **Referral to physical therapy**
 - **Gentle ROM below neutral**
- **EMS to calf musculature, modalities**

Weight-bearing with crutches

Week 3 – 25% Week 4 – 50%

Week 5 – 75% Week 6 – 100%

Achilles Injury: Rehab Protocol

Weeks 6 - 12

- **Wean wedges from boot, then wean out of boot (weeks 6-9)**
 - **No ROM past neutral until week 12**
- **Graduated resistance exercises (open and closed chain)**
 - **Proprioception**
 - **Low impact fitness/cardio**

Achilles Injury: Rehab Protocol

Weeks 12-16

- Continue strengthening
 - Light jogging

4-6 months

- Non-cutting/pivoting sporting activities

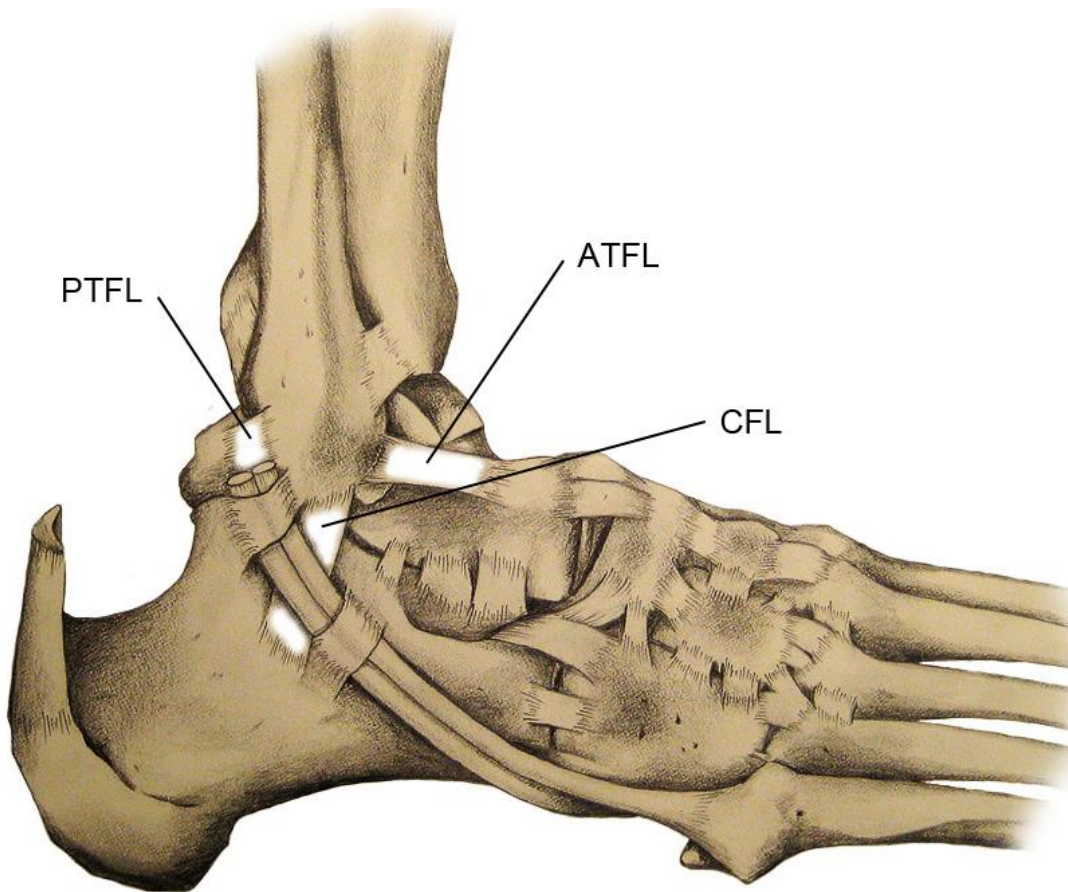
6-8 months

- Return to full sporting activities

Acute Ankle Sprain

- **Extremely common**
- **Generally occurs with inversion injury to the foot and ankle**
- **Lateral ligaments most commonly injured (90%)**
- **Recovery is variable depending on severity and additional injuries**

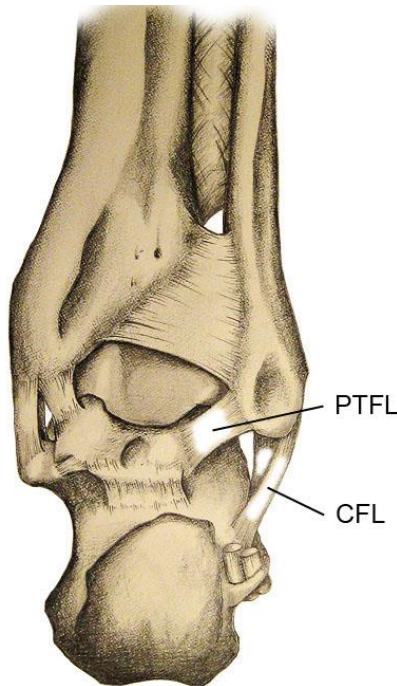
Ankle Sprain : Anatomy



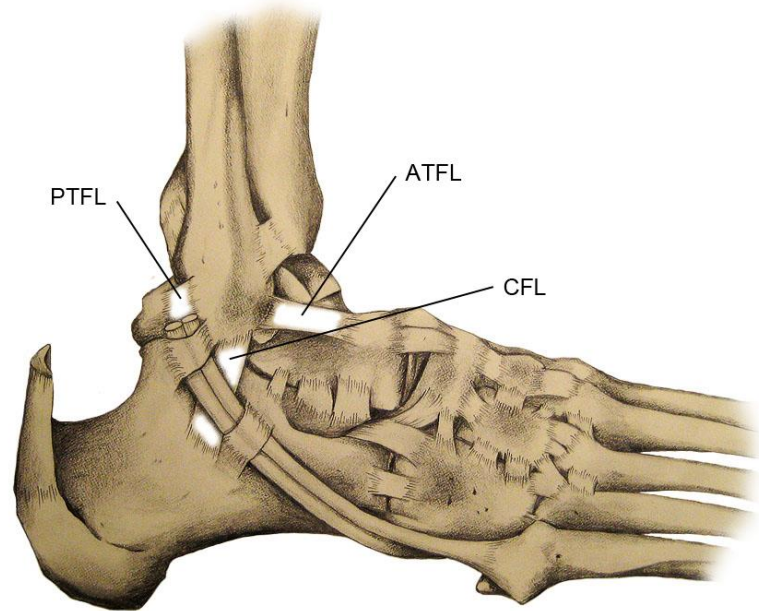
- **ATFL most commonly injured**
- **CFL and deltoid can also be involved**

Ankle Sprain : Anatomy

- **High ankle sprain/ syndesmotic injury**
 - Stabilizes articulation between tibia and fibula
 - Multiple ligamentous structures



Posterior / Back



Anterior / Front

Acute Ankle Sprain : Risk Factors

- **High impact sports**
 - Indoor court sports with highest risk
- **Previous sprain**
- **Poor balance/proprioception**
- **Limitations in hindfoot or ankle motion**
 - High arched or cavovarus foot

Acute Ankle Sprain : History

- **Mechanism of injury**
- **History of previous injuries**
- **Location/severity of pain**
- **Ability to bear weight**
- **Swelling/ecchymosis**
- **Locking, catching, giving way**

Acute Ankle Sprain : Examination

- **Evaluate for swelling/ecchymosis**
- **Evaluate ROM**
- **Location of tenderness**
- **Strength and neurovascular exam**
- **Stability Testing**
 - Anterior drawer
 - Talar tilt testing
 - External rotation stress
 - Squeeze test

Acute Ankle Sprain : Examination

- **Location of pain**
 - ATFL/lateral ligaments
 - Deltoid
 - Lateral or medial malleolus
 - Dorsal midfoot
 - 5th Metatarsal base
 - Syndesmosis
 - Proximal fibula

Acute Ankle Sprain : Workup

- **Indication for Radiographs**
 - Difficulty bearing weight
 - TTP over areas other than ATFL
- **Standard Ankle 3v series**
 - Weight bearing if possible
- **Add 3v Foot or 2v Tibia/Fibula for pain in other locations**

Acute Ankle Sprain : Workup

- **Role for MRI in acute setting**
 - Suspicion of syndesmotic injury
 - Further evaluation of osteochondral lesion
- **MRI more useful 6-8 weeks after injury if pain/symptoms persist**

Acute Ankle Sprain : Initial Treatment

Mild sprain – able to bear weight

- Compression wrap, RICE, home exercise program

Moderate sprain – some pain with weight bearing, no/minimal instability on exam

- Lace up brace/functional ankle brace
- RICE, home exercise program
- Referral to ortho if symptoms >2-3 weeks

Acute Ankle Sprain : Initial Treatment

Moderate to severe sprain – unable to bear weight or instability on exam

- Splint or cam boot
- Non-weight bearing, crutches
- Referral to orthopaedic surgery

Acute Ankle Sprain : Other Factors

Suspected syndesmosis injury

Osteochondral lesion

Fractures

Peroneal Tendon Subluxation

Non-weight bearing, splint or boot

Refer to orthopaedic surgery

Acute Ankle Sprain : Rehab

Mild and moderate sprains may be amenable to home exercise program

**Range of motion
Strengthening
Balance/Proprioception**

Acute Ankle Sprain : Rehab

Proprioception - perception or awareness of the position and movement of the body

- **Key factor in ankle rehabilitation**
- **Can reduce risk of recurrent sprain**
- **Proprioceptive training reduces overall risk of ankle sprain**

Rivera MJ, et al. Proprioceptive Training for the Prevention of Ankle Sprains: An Evidence-Based Review. *J Athl Train.* 2017 Nov;52(11):1065-1067.

Acute Ankle Sprain : Rehab

Proprioception Exercises

- **Home – single leg balance with eyes open and closed**
- **Physical Therapy**
 - Single leg balance with arm motions
 - Wobble board, ankle disc, bosu ball exercises
 - Tandem gait/stance
 - Medicine ball training

Acute Ankle Sprain : Outcomes

- **Early functional rehabilitation provides to quickest return to activity**
- **Ongoing pain or instability can occur following acute sprain in up to 30%**
 - Typically results from additional injuries
 - Fractures, osteochondral lesions, syndesmotic injuries, peroneal tendon pathology
- **Some swelling typical for 2-3 months**
- **When in doubt, refer to ortho**

Acute Ankle Sprain : Outcomes

- **Surgical intervention for chronic instability is infrequent**
 - Typically combined with ankle arthroscopy to evaluate for concurrent pathology

Osteochondral Lesion of Talus

- **Fragment of cartilage and underlying bone**
- **Can occur along with ankle sprain**
- **Fragment may partially or completely detach**
- **Pain, swelling, locking, catching**
- **Ankle arthroscopy can be considered if nonoperative care fails**

Syndesmotic Injury

- **Less than 10% of all ankle sprains**
- **Often occurs in conjunction with ankle fractures**
- **Non-surgical for mild sprains**
- **Surgical fixation for instability**
 - Screws vs suture fixation remains controversial
- **Poor outcomes seen with chronic instability**

Questions?

Where Do I Find More Information

Orthoinfo.aaos.org

- American Academy of Orthopaedic Surgeons

www.aofas.org/footcaremd

- American Orthopaedic Foot and Ankle Society

Call for an appointment!

BayCare Medical Group - Orthopedics

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References

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2. Doherty C, Bleakley C, Delahunt E, Holden S. Treatment and prevention of acute and recurrent ankle sprain: an overview of systematic reviews with meta-analysis. *Br J Sports Med.* 2017 Jan;51(2):113-125. doi: 10.1136/bjsports-2016-096178. Epub 2016 Oct 8.
3. Yuen CP, Lui TH. Distal Tibiofibular Syndesmosis: Anatomy, Biomechanics, Injury and Management. *Open Orthop J.* 2017 Jul 31;11:670-677. doi: 10.2174/1874325001711010670. eCollection 2017.
4. Looze CA, Capo J, Ryan MK, Begly JP, Chapman C, Swanson D, Singh BC, Strauss EJ. Evaluation and Management of Osteochondral Lesions of the Talus. *Cartilage.* 2017 Jan;8(1):19-30. Epub 2016 Sep 28.