Foot & Ankle Exam

Casey Wagner, MD
Non-Operative Sports Medicine
Emory Sports Medicine
Atlanta Wildcats Team Physician
Disclosures

• Nothing to disclose
Who is excited to talk about feet?
Outline

• Anatomy
• Exam
  • Inspection
  • Motion
  • Gait
  • Palpation
  • Strength
  • Neuro
  • Special tests
Bone Anatomy
Medial
Ligaments

MEDIAL COLLATERAL (DELTOID) LIGAMENT

- Posterior tibial ligament
- Tibiofibular ligament
- Tibionavicular ligament
- Anterior tibial ligament

Plantar calcaneonavicular (spring) ligament

Tibia
Lateral view

- Extensor digitorum longus muscle
- Superior extensor retinaculum
- Tendinous sheath of tibialis anterior
- Lateral malleolus and subcutaneous bursa
- Inferior extensor retinaculum
- Tendinous sheath of extensor digitorum longus and peroneus tertius
- Tendinous sheath of extensor hallucis longus
- Calcaneus
- Extensor digitorum brevis muscle
- Abductor digiti minimi muscle
- Calcaneal (Achilles) tendon
- Common tendinous sheath of fibularis (peroneus) longus and brevis
- Subcutaneous calcaneal bursa
- (Subtendinous) bursa of calcaneal tendon
- Superior and Inferior fibular (peroneal) retinacula
- Fibularis (peroneus) tertius tendon
- Tuberosity of 5th metatarsal bone
- Fibularis (peroneus) brevis tendon
- Fibularis (peroneus) longus tendon
Ligaments
Inspection

• Ecchymosis
• Swelling
• Alignment
LISFRANC

High correlation
Alignment

- Pes Planus

- Pes Cavus

https://www.alaskapodiatry.wordpress.com/2014/04/24/high-arched-foot-treatment-in-anchorage-ak/
Motion
Gait

• 5 degrees of calcaneal pronation acceptable
Gait

• Toe and heel walking

• Toe assessing plantar flexors and L5

• Heel walking assessing dorsiflexors and S1
Palpate

• Bone
• Tendons
• Ligaments
  • Be precise
• Poor healing areas
  • Achilles mid
  • Jones
  • Navicular

https://www.med-ed.virginia.edu/courses/pom1/pexams/LowExtrExam/
Ottawa Criteria

A series of ankle x-ray films is required only if there is any pain in the malleolar zone and any of these findings:
- Bone tenderness at A
- Bone tenderness at B
- Inability to bear weight both immediately and in emergency department

A series of ankle x-ray films is required only if there is any pain in the mid-foot zone and any of these findings:
- Bone tenderness at C
- Bone tenderness at D
- Inability to bear weight both immediately and in emergency department

https://www.bmj.com/content/326/7386/417/F1
Iselin’s Apophysitis

Growth plate closes between the age of 8 – 13 years old
Palpate/Percuss
Stress Fracture Common Sites

- Tibia
  - Compression vs tension side
  - MTSS vs Anterior Tibia
  - Medial Malleolus
  - Calcaneus
  - Navicular (avascular)
  - Metatarsals (second and third)
    - 2\textsuperscript{nd} – Dancer’s fracture (en pointe position)
  - Sesamoid
Strength

- Inversion
  - Posterior tibialis tendon
- Eversion
  - Peroneus longus, brevis, tertius
  - Plantar flex (longus)
  - Dorsiflex (brevis, tertius)
Strength

- Plantar flexion
  - Gastrocnemius
  - Soleus
  - Accessory flexors
Strength

• Plantarflexion isolation
  • EXTENDED KNEE gastroc
  • FLEXED knee soleus
Strength

• Dorsiflexion
  • Tibialis anterior muscle
  • Extensor digitorum longus
• Accessory
  • EHL
Strength/Neuro

• Foot Drop
  • Typically injury to common peroneal nerve

• Extensor Hallucis Longus
  • Foot drop
  • Nerve: deep peroneal (L5/S1)

https://www.mayoclinic.org/diseases-conditions/foot-drop/diagnosis-treatment/drc-20372633
Dermatomes
Reflexes

- Achilles = S1
- Medial biceps femoris = L5
- Patella = L4
Nerve Distribution

https://www.brainkart.com/article/Lower-Extremity-Peripheral-Nerve-Blocks--Ankle-Block_27248/
Nerve Entrapments

• Tarsal Tunnel
  • Can occur with jogging
  • Spare medial heal usually

• Medial plantar nerve entrapment
  • “Jogger’s foot”
  • Involves medial heal

• Sometimes confused with plantar fasciitis
  • If not responding to treatment consider nerve entrapment

Special tests
Anterior Drawer

- Assess ATFL
- Positive
  - Laxity
  - Pain
  - No end point
  - Always compare
Talar Tilt

• Assess CFL
  • Dorsiflex

• Positive for
  • Laxity
  • Pain
  • No sharp end point
  • Compare
Kleigers (external rotation test)

• Assess Deltoid ligament
  • Laxity
  • Pain medial ankle
  • Compare

• Assess Syndesmosis
  • Pain distal fib
Squeeze Test

- Assess Syndesmosis
- High Ankle Sprain
  - Squeeze high to low
  - Pain localized for a positive test
Bump Test

• Assessing
  • Talar dome
  • Syndesmosis
  • Stress fracture

• Positive
  • Pain localized to anatomic area
Single heel raise

• Assess PTT
  • Pain medially
  • Positive if unable to raise heel
Too many toes sign

• Assess PTT function

• Positive
  • Pronated foot
  • Pes planus
  • More than 4\textsuperscript{th} and 5\textsuperscript{th} toes seen
Windlass Action

- Failure of longitudinal arch to rise with dorsiflexion of toes
  - Indicates prolonged pes planus and stretching of plantar aponeurosis
Windlass Test

- Pain with test at proximal insertion of plantar fascia
- Plantar Fasciitis
Thompson

• Plantaris

Calf (soleus muscle) being gently squeezed

If the Calf squeeze MOVES the foot, then the Achilles tendon is not fully ruptured between the soleus muscle and the heel bone.

If the Calf squeeze does NOT move the foot, then there is a full Achilles tendon rupture between the soleus muscle and the heel bone.
Single leg Hop test

• Good for stress fracture
Metatarsal Squeeze test

• Evaluate for Morton’s Neuroma
  • 3rd and 4th metatarsal heads
Dorsoplantar drawer test

- Turf toe test and volar plate injury
- Assessing volar plate - compare to contralateral side
- MTP Lachman
Thank you
Sources

1. Orthobullets.com
2. O’Connor et al. ACSM’s Sports Medicine A Comprehensive Review
3. Researchgate.net