ULTRASOUND OF THE FOOT AND ANKLE

Tiffany Tsay, MD, RMSK
Towson Orthopaedic Associates
May 3, 2019
Financial Disclosures/Conflicts of Interest

None
Outline

- Ultrasound Basics
- Anterior Ankle Exam
- Medial Ankle Exam
- Lateral Ankle Exam
- Posterior Ankle Exam
- Foot Exam
- Selected Pathology
Why Ultrasound?

- Non-invasive
- Point of care
- Inexpensive
- Better spatial resolution than MRI
- Targeted exam
- Dynamic exam
Ultrasound Basics

- Ultrasound
  - Pressure waves vibrating at a frequency above the sound of human hearing
- Piezoelectric crystals
  - Electric current ↔ ultrasound waves
- Orientation
Ultrasound Basics

- Echogenicity
- Artifacts
  - Anisotropy

Sayed 2012
Ultrasound Basics
Evaluating a Structure

- Two orthogonal planes
  - Long axis
  - Short axis
- Along the length and width of the structure
EVALUATION OF THE FOOT AND ANKLE
Anterior Evaluation

- Sagittal probe orientation
- Anterior Joint Recess
  - Effusion
  - Hyaline cartilage abnormalities
Anterior Evaluation

- Transverse probe orientation
- Anterior Structures
  - *Tibialis Anterior*
  - *Extensor hallucis longus*
  - *Dorsalis pedis artery*

Jacobson 2013
Anterior Evaluation

- Anterior Structures, cont.
  - Deep peroneal (fibular) nerve
  - Extensor digitorum longus
  - Peroneus (fibularis) tertius

Lateral → Medial: FEET

Jacobson 2013
Anterior Evaluation

- Long axis evaluation

Jacobson 2013
Medial Evaluation

- Probe transverse/short axis
- Tibialis posterior
  - (Accessory navicular)
- Flexor digitorum longus
- Posterior tibial artery
- Posterior tibial vein
- Tibial nerve
- Flexor hallucis longus

Tom, Dick, And a Very Nervous Harry
Medial Evaluation

- Follow tendons of interest in long axis
  - *Tibialis posterior*
    - Thickening
    - Hypoechogeticity
    - Fluid

- Knot of Henry
  - *FDL crosses superficially over FHL*
Medial Evaluation

- Deltoid ligament
  - Coronal orientation
  - Tibiocalcaneal
  - Tibionavicular (superficial)
  - Anterior tibiotalar
  - Posterior tibiotalar
Lateral Evaluation

- Supramalleolar, transverse
- Peroneus brevis
  - 5th metatarsal base
- Peroneus longus
  - Medial cuneiform
  - 1st metatarsal base
  - Os peroneum
- Short axis evaluation
Lateral Evaluation

- Anterior talofibular ligament
  - Most commonly sprained ankle ligament
- Calcaneofibular ligament


Jacobson 2013
Lateral Evaluation

- Anterior inferior tibiofibular ligament

https://www.orthobullets.com/pediatrics/4026/tillaux-fractures
Jacobson 2013
Lateral Evaluation

- Interosseous membrane
  - *If AITFL injured, evaluate this*
Posterior Ankle Evaluation

- Achilles tendon
- Kager fat pad
- Retro-Achilles bursa
Heel Evaluation

- Plantar aponeurosis
Forefoot Evaluation

- Guided by symptoms
  - Bone
  - Tendon
  - Joint
- Morton neuroma
SELECTED ABNORMALITIES OF THE FOOT AND ANKLE
Tibialis Posterior Abnormalities

- Tendinosis
- Tenosynovitis
- Tear
  - Partial intra-substance
  - Longitudinal split
  - Full-thickness complete
Peroneal Tendon Abnormalities

- Tendinosis
- Tear
  - Intrasubstance
  - Longitudinal split
- Tendon dislocation
Anterior Talofibular Ligament (ATFL) Injury

- Most commonly injured ligament in the ankle
- Thickening or discontinuity of ligament
- Sonographic anterior drawer
Anterior Inferior Tibiofibular (AITFL) Ligament Injury

- Tears
- Widening of tibia/fibula space

Jacobson 2013
Achilles Tendon

- Tendinosis
- Enthesophyte
- Rupture

Jacobson 2013
Plantar Fascia

- Plantar fasciosis

Jacobson 2013
Final Thoughts

- Ultrasound is a helpful tool for evaluation of anatomy and pathology around the foot and ankle
  - Focused exam
  - Dynamic
QUESTIONS?

