AMSER Case of the Month January 2021

38 year old female with bilateral foot pain

Robert Wu MS4

Dr. James Brian

Dr. Pamela Brian

Penn State College of Medicine

PennState Health
Milton S. Hershey
Medical Center

AMSER

Patient Presentation

HPI: 38 year old female presents to orthopedics clinic complaining of bilateral foot pain. She says her ankles “give out” often when walking. She also endorses intermittent pain along the right heel and along the anterior left ankle that’s 6/10, exacerbated by activity, but not relieved by anything

PMHx: Fibromyalgia, diabetes, arthritis

SurgHx: C-section, cholecystectomy, tubal ligation

FamHx: Diverticulitis in maternal grandfather and paternal grandfather, lung emphysema in maternal grandmother

SocialHx: Current tobacco user, 1 PPD for 21 years

Exam

ROS: Negative except for bilateral foot pain

Physical Exam:

- Normal arches, plantigrade (entire foot soles on ground), heels in slight varus
- Normal ankle range of motion, normal subtalar motion (pronation, supination)
- Tightness in bilateral Achilles tendons and gastrocnemius muscles
- Left tarsal tunnel tenderness and swelling, and positive left ankle Tinel sign
- No erythema, warmth, or signs of infection

What Imaging Should We Order?

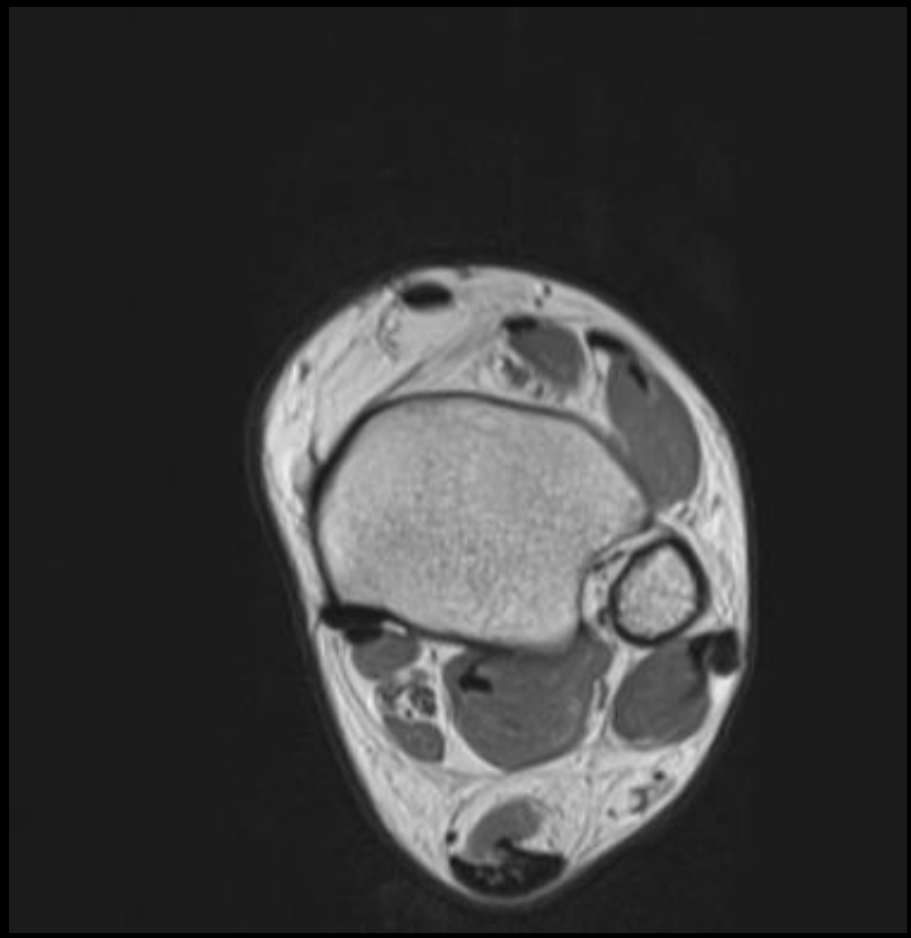
ACR Appropriateness Criteria

Variant 6: **Chronic foot pain. Entrapment syndromes. Radiographs negative or equivocal. Clinical concern includes Baxter's neuropathy. Next imaging study.**

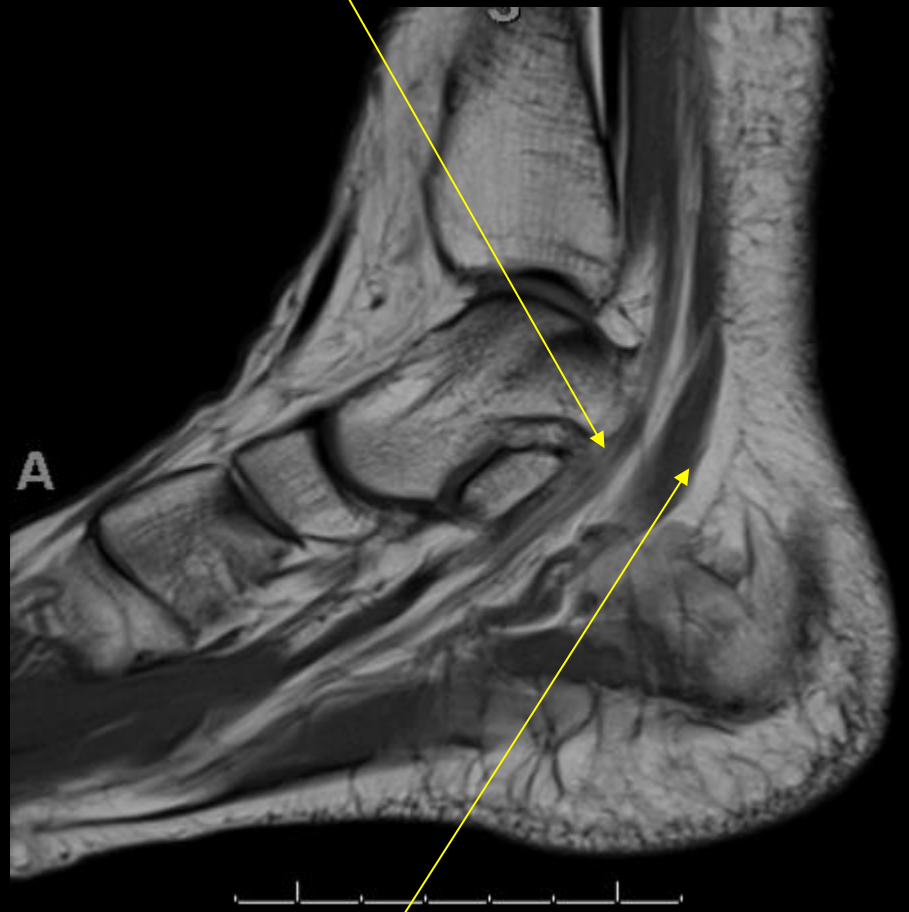
Procedure	Appropriateness Category	Relative Radiation Level
US foot	Usually Appropriate	O
MRI foot without IV contrast	Usually Appropriate	O
MRI foot without and with IV contrast	Usually Not Appropriate (Disagreement)	O
CT foot with IV contrast	Usually Not Appropriate	☢
CT foot without and with IV contrast	Usually Not Appropriate	☢
CT foot without IV contrast	Usually Not Appropriate	☢
Bone scan with SPECT or SPECT/CT foot	Usually Not Appropriate	☢☢☢

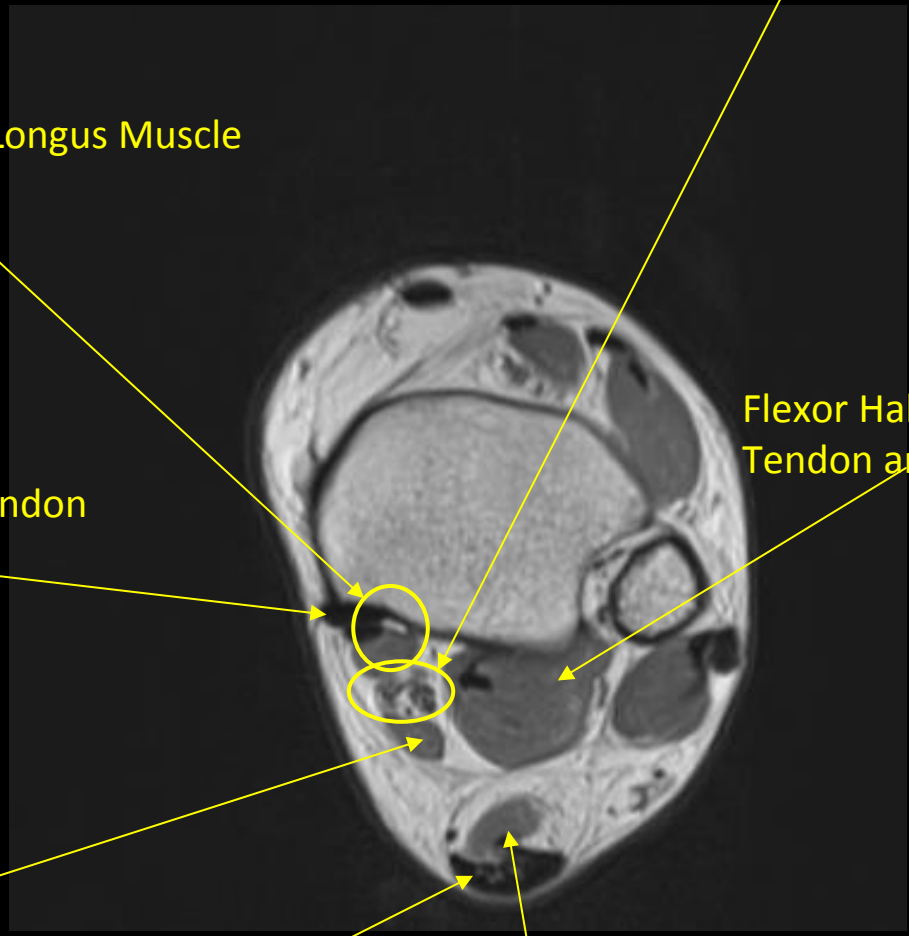
This imaging modality was ordered by the orthopedics doctor

Findings (unlabeled)



Findings (labeled)





Flexor Hallucis Tendon

Neurovascular Bundle

Flexor Digitorum Longus Muscle and Tendon

Posterior Tibialis Tendon

Flexor Hallucis Longus Tendon and Muscle

Flexor Digitorum Accessory Longus

Achilles Tendon

Soleus

Final Dx: Tarsal Tunnel Syndrome secondary to Flexor Digitorum Accessory Longus

Case Discussion - Tarsal Tunnel Syndrome

Epidemiology:

- 4-8%, males > females, unilateral
- Most commonly caused by fracture or dislocation of talus, calcaneus, or medial malleolus, other causes include rheumatoid arthritis, other causes of inflammation, tumors
- Flexor digitorum accessory longus - the most common accessory muscle in posterior compartment of ankle

Symptoms:

- Compressive neuropathy - paraesthesia, dysesthesia, hyperaesthesia radiating from behind the malleolus to sole, heel, digits of forefoot
- Localized tenderness, pain, mass, or swelling over medial malleolar region
- Compartment syndrome

Physical Examination

- Inability to abduct, adduct, flex, or extend hallux
- Valleix phenomenon - pain extension to mid-calf by percussing nerve at site of entrapment
- Hoffmann-Tinel sign - tingling at site of compression or along nerve course when nerve tapped at compression site
- Dorsiflexion-eversion test - clinician causes eversion and dorsiflexion 5-10 second intensifies symptoms

Case Discussion - Tarsal Tunnel Syndrome

Workup:

- Electrodiagnostic testing: prolonged tibial motor distal latencies, slowing of conduction velocities across flexor retinaculum when recording medial and lateral plantar nerve territories

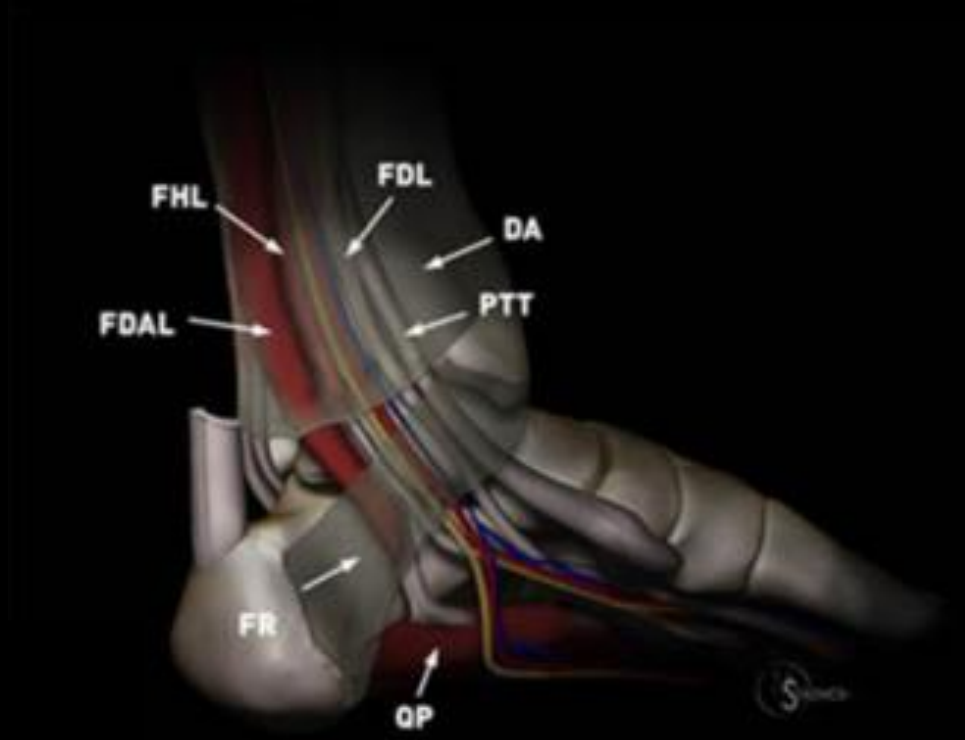
Treatment:

- Patients with tarsal tunnel syndrome and no history of trauma → conservative treatment including NSAIDs, shoe modification, orthotics, corticosteroid injection
- Failure of conservative treatment and demonstrated entrapment → surgical decompression of tibial nerve

Case Discussion - Flexor Digitorum Accessory Longus

Location:

- Originates from posterior compartment structures including the flexor retinaculum, tibia, fibula, flexor hallucis longus, soleus, deep fascia, transverse intermuscular septum, flexor digitorum longus, peroneus brevis, calcaneus
- Courses through tarsal tunnel deep to the neurovascular bundle
- Deep to the deep aponeurosis and flexor retinaculum
- Inserts onto the flexor digitorum longus tendon or quadratus plantae muscle after traveling through tarsal tunnel and porta pedis
- Lies alongside the posterior margin of the flexor hallucis longus muscle and tendon



Case Discussion - Flexor Digitorum Accessory Longus

Complications:

- Tarsal Tunnel Syndrome (compression of posterior tibial nerve)
- Flexor hallucis longus (FHL) tenosynovitis (friction between FDAL muscle and tendon in tarsal tunnel)
- Paralysis of digital abductor and flexor muscles

Workup/Imaging:

- Posterior arthroscopy ankle
- MRI
- Electroneurodiagnostic studies
- Intraoperative discovery

Treatment:

- Open surgery with tarsal tunnel decompression and FDAL resection with persistent symptoms from nerve compression

References:

1. Melville P. Accessory flexor digitorum longus muscle | Radiology Reference Article | Radiopaedia.org. Radiopaedia. Accessed October 6, 2020. https://radiopaedia.org/articles/accessory-flexor-digitorum-longus-muscle?lang=us
2. Accessory Muscles of the Ankle. Radsource. Published November 3, 2008. Accessed October 6, 2020. https://radsource.us/accessory-muscles-of-the-ankle/
3. Sookur PA, Naraghi AM, Bleakney RR, Jalan R, Chan O, White LM. Accessory Muscles: Anatomy, Symptoms, and Radiologic Evaluation. *RadioGraphics*. 2008;28(2):481-499. doi:10.1148/rg.282075064
4. Diagnosis and Surgical Management of Flexor Digitorum Accessorius Longus–Induced Tarsal Tunnel Syndrome - The Journal of Foot and Ankle Surgery. Accessed October 6, 2020. https://www.jfas.org/article/S1067-2516(07)00292-X/pdf
5. Batista JP, del Vecchio JJ, Golanó P, Vega J. Flexor Digitorum Accessorius Longus: Importance of Posterior Ankle Endoscopy. Case Reports in Orthopedics. doi:https://doi.org/10.1155/2015/823107
6. Gomes Júnior NP, Andreoli CV, Pochini A de C, et al. Presence of a long accessory flexor tendon of the toes in surgical treatment for tendinopathy of the insertion of the calcaneal tendon: case report. *Revista Brasileira de Ortopedia*. 2016;51(1):105-108. doi:10.1016/j.rboe.2015.12.003
7. Shin J, Shim J-C, Lee K, Kim H, Lee G-J, Suh J. The MRI Findings of Flexor Digitorum Accessorius Longus Muscle: a Case Report. *Investigative Magnetic Resonance Imaging*. 2016;20:123. doi:10.13104/imri.2016.20.2.123

AMSER