

ORGANIZATION: Los Angeles Radiological Society
 VENUE: 66th Annual Midwinter Radiology Conference
 DATE: February 22, 2014 – Saturday 3:00pm – 5:00pm
 TITLE: Imaging the Painful Hindfoot, Diabetic Foot, Knee, and Ankle

Presenters:
 Donna G. Blankenbaker, MD – Professor of Radiology, Medical Director of Outpatient Radiology, Univ of Wisconsin Hospital & Clinics
 Benjamin D. Levine, MD – Assistant Clinical Professor of Radiology, Musculoskeletal Section, UCLA Health System
 Mark Schweitzer, MD – Professor & Chair of Radiology, Stony Brook University School of Medicine

ANSWER KEY

PRESENTATION 1: Imaging the Painful Hindfoot

QUESTION 1

Which of the following about the Achilles tendon is correct?

- A. Has a true synovial tendon sheath
- B. Normal rounded configuration
- C. Hypovascular region 4-6 cm above the insertion
- D. More commonly injured in women
- E. Common tear site at calcaneal insertion

DISCUSSION RE: ANSWER OPTIONS

Answer: C

- A. The Achilles tendon has not true synovial tendon sheath. It is surrounded by paratenon which consists of loose areolar tissue and is richly vascularized.
- B. The normal appearance is that of parallel anterior and posterior surfaces with the anterior portion flat or concave and posteriorly convex.
- C. It is at this hypovascular region located 4-6 cm above the calcaneal insertion where tears commonly occur.
- D. Achilles injuries are more common in men; “weekend warrior” and 30-50 year of age.
- E. The common tear site is 4-6 cm above the calcaneal insertion.

REFERENCES FOR QUESTION 1

1. Schweitzer ME, Karasick D. MR imaging of disorders of the Achilles tendon. AJR Am J Roentgenol 2000;175:613-626.
2. Lawrence DA, Rolen MF, Morshed KA, Moukaddam H. MRI of heel pain. AJR 2013;200:845-855.

QUESTION 2

Which of the following is true in regard to the plantar fascia?

- A. Normal thickness is 7-8 mm
- B. Rupture commonly occurs distally
- C. MR feature of fasciopathy is fluid signal extending across the fascia
- D. The lateral bundle is most commonly involved with disease
- E. Multiple lesions are characteristic of fibromas

DISCUSSION RE: ANSWER OPTIONS

Answer: E

- A. The normal thickness of the plantar fascia is 3 mm and is considered thickened when greater than 5 mm.
- B. Rupture of the plantar fascia is typically a sports-related injury that can be seen in athletes performing running and jumping maneuvers. Most cases of rupture involve the proximal fascia near its calcaneal insertion. Distal tears may also occur.
- C. MR imaging findings of plantar fasciopathy include thickening, intrafascial edema, and peri-fascial edema. Bone marrow edema is commonly present at the calcaneal tubercle. Fluid signal extending across the fascia is seen with tear.
- D. The plantar fascia consists of three bundles: central, lateral and medial. The medial bundle is the least significant and arises from the midportion of the central bundle extending over the abductor hallucis to combine with the deep fascia on the medial foot. The central bundle is the most important of the three and is commonly affected by disease. It runs from the medial tubercle of the calcaneus and blends with the deep fascia and transverse ligament that combine at the level of the metatarsal heads. The lateral bundle lies beneath the abductor digiti minimi.
- E. The typical plantar fibroma appears as a focal, often oval-shaped area which is intimately related to the plantar fascia. The presence of multiple lesions centered on the plantar fascia is characteristic.

REFERENCE FOR QUESTION 2

1. McNally EG, Shetty S. Plantar Fascia: Imaging Diagnosis and Guided Treatment. Semin Musculoskelet Radiol 2012;14:334-343.
2. Lawrence DA, Rolen MF, Morshed KA, Moukaddam H. MRI of Heel Pain. AJR Am J Roentgenol 2013;200:845-855.

PRESENTATION 2: The Diabetic Foot

QUESTION 3

Select the single best answer.
 The most common cause of osteomyelitis in adults is

- A. Dental disease
- B. Skin infections
- C. Complications of diabetes
- D. Sick cell

DISCUSSION RE: ANSWER OPTIONS

Correct Answer = C. Diabetes.
 95% of osteomyelitis in adults is secondary to complications of diabetes. Involvement of the bone is typically from contiguous spread from an overlying soft tissue infection. Osteomyelitis complicates approximately 20% of diabetes related soft-tissue foot infections. Factors predisposing to osteomyelitis include deep wounds, peripheral neuropathy, Charcot’s arthropathy, arterial insufficiency poor glycemic control and immune dysfunction.

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ANSWER KEY

REFERENCE FOR QUESTION 3

Lipsky, B. Osteomyelitis of the foot in diabetic patients. Clin Infectious diseases 25:6. 1318-1326.

<http://cid.oxfordjournals.org/content/25/6/1318.full.pdf+html>

Rao N, Ziran B, Lipsky BA. Treating Osteomyelitis: Antibiotics and Surgery. Plastics and Reconstructive Surgery. Vol 127, S1S Jan 2011. 1775-1875

QUESTION 4

DISCUSSION RE: ANSWER OPTIONS

The least common location for diabetic infections is

- A. Forefoot
- B. Hindfoot
- C. Fingers
- D. Spine

Correct Answer = C. Fingers

The forefoot is the most common location, followed by the hind foot, spine and fingers.

REFERENCE FOR QUESTION 4

Lipsky, B. Osteomyelitis of the foot in diabetic patients. Clin Infectious diseases 25:6. 1318-1326.

<http://cid.oxfordjournals.org/content/25/6/1318.full.pdf+html>

PRESENTATION 3: Knee: Extensor Mechanism

QUESTION 5

DISCUSSION RE: ANSWER OPTIONS

What feature is found with transient patellar dislocation?

- A. Contusion medial femoral condyle
- B. Torn lateral stabilizers
- C. Medial patellofemoral ligament tear
- D. Superior patella fracture
- E. Patella baja

Answer: C

- A. Contusions found in individuals with transient patellar dislocation occur within the lateral femoral condyle and inferior pole of the medial patella.
- B. The medial stabilizers are torn. The medial stabilizers include the retinaculum, medial patellofemoral ligament, and vastus medialis oblique muscle.
- C. The medial patellofemoral ligament is commonly injured following lateral patellar dislocation in up to 90% of injuries. It is the primary medial restraint for the patella (provides 50-60% passive restraint).
- D. Impaction or avulsion fractures may occur and typically involve the inferior medial patella.
- E. Patella alta is a risk factor for patella dislocation.

REFERENCE FOR QUESTION 5

Elias DA, White LM, Fithian DC. [Acute lateral patellar dislocation at MR imaging: injury patterns of medial patellar soft-tissue restraints and osteochondral injuries of the inferomedial patella.](#) Radiology 2002; 225(3):736-743.

QUESTION 6

DISCUSSION RE: ANSWER OPTIONS

Osteochondral lesions of the patella are considered to be a cause of anterior knee pain. Which of the following is true in regard to this abnormality?

- a. More common than lesions within the medial femoral condyle
- b. Occur within the upper half of the patella
- c. 80% bilateral
- d. Occur within the central/medial facet
- e. Underlying osseous changes found on both sides of the joint

Answer: D

- a. Osteochondral lesions are more common within the medial femoral condyle.
- b. These lesions are more common within the lower ½ of the patella.
- c. 20% are bilateral.
- d. Commonly occur within the central/medial patellar facet.
- e. Chondromalacia patella may be difficult to distinguish from osteochondral lesions in some cases as there can be underlying osseous changes such as a subchondral cysts and bone marrow edema. Osteochondral lesions is a primary bone problem, with deformity of the subchondral bone and should affect only one side of the joint and the subchondral bone, as opposed to a full-thickness chondral lesions due to osteoarthritis. When osseous changes are found on both sides of the joint, osteoarthritis should be considered.

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ANSWER KEY

REFERENCE FOR QUESTION 6

1. Ostlere S. The extensor mechanism of the knee. *Radiol Clin N Am* 2013;51:393-411.
2. Choi YS, Cohen NA, Potter HG, Mintz DN. Magnetic resonance imaging in the evaluation of osteochondritis dissecans of the patella. *Skeletal Radiol* 2007;36:929-935.

PRESENTATION 4: Imaging Sports Related Ankle Injuries

QUESTION 7

All of the following are associated with extraarticular lateral hindfoot impingement EXCEPT:

- a. Hindfoot valgus
- b. Lateral ankle pain
- c. Subfibular impingement
- d. Advanced posterior tibialis tendon dysfunction
- e. Hindfoot varus

DISCUSSION RE: ANSWER OPTIONS

Correct Answer = e

Lateral hindfoot impingement is associated with advanced posterior tibialis tendon tear/dysfunction and greater MRI hindfoot valgus angle. With posterior tibialis tendon dysfunction, the longitudinal arch of the foot collapses progressively through four stages. In the later stages, lateral ankle pain may result due to worsening hindfoot valgus in association with talocalcaneal and/or subfibular impingement.

REFERENCE FOR QUESTION 7

Donovan A, Rosenberg ZS. Original Research. Extraarticular Lateral Hindfoot Impingement with Posterior Tibial Tendon Tear: MRI Correlation *AJR* 2009; 193:672-678.

QUESTION 8

Causes of anterior ankle impingement include all of the following EXCEPT:

- a. Osteophytes
- b. Synovial thickening
- c. Intraarticular bodies
- d. Osteoid osteoma of the talar neck
- e. Fibrous bands/scarring

DISCUSSION RE: ANSWER OPTIONS

Correct Answer = d

Anterior ankle impingement is often the result of osteophytes or enthesophytes at the anterior aspect of the tibial plafond and dorsal aspect of the talus. With dorsiflexion, these bony prominences can cause impingement. Other causes of anterior impingement include synovial thickening/synovitis, fibrous bands/scarring, intraarticular bodies, or osteochondral lesions. Osteoid osteoma of the talus can present with clinical symptoms similar to those with anterior ankle impingement, but is not considered an impingement lesion.

REFERENCE FOR QUESTION 8

Levine BD, Motamedi K, Seeger LL. Imaging Sports-Related Ankle Injuries. *Curr Sports Med Rep* 2010; 9:269-277.