

## Differential Diagnosis of Acute, Post-traumatic Foot Pain

Cause	Clinical Features	Imaging Findings
Retained foreign body	History of penetrating wound	Radio-opaque foreign bodies (metal, rocks, glass) will be dense on XR and CT whereas wood splinters be of similar density to soft tissue and thus difficult to see. Foreign bodies (including wood) may be echogenic and shadow-casting on US. MR characteristics depend on the structure of the foreign body: there may be a signal void (calcium, non-ferromagnetic metals, glass, wood) or artifact (ferromagnetic material).
Fracture of the midfoot or hindfoot bones	Pain and tenderness along the fracture site(s); swelling; widening of the foot with calcaneal fractures; MOI: usually a fall or twisting injury	Discontinuous cortex and displaced bone fragment on XR, CT, and MR; abnormal marrow signal on MR
Metatarsal or phalangeal fracture	Pain and tenderness along the injured metatarsal or phalanx; MOI crush or jamming the toe	Discontinuous cortex and displaced bone fragment on XR, CT, and MR; abnormal marrow signal on MR
Dislocation of the midfoot or forefoot joints	Deformity of the dislocated joint; pain and tenderness along the dislocated joint; associated fracture; MOI: direct trauma to the site	Displaced bones; associated fracture
Ligament and tendon tears	Pain and tenderness along the involved structure	Indirect signs (e.g. widening of the distance between the 1 <sup>st</sup> and 2 <sup>nd</sup> MT bases with Lisfranc injury) with XR (especially standing), CT, and MR; swelling and discontinuity of the tendon or ligament on US and MR
MOI = mechanism of injury; XR = plain film radiography; CT = computed tomography; MR = magnetic resonance; US = ultrasound		

# Differential Diagnosis of Foot Pain (Not Acute, Post-traumatic)

Cause	Clinical Features	Imaging Findings
<b>Bone Abnormalities</b>		
Stress fracture including of the sesamoid bones (sesamoiditis)	Repeated local trauma	Focal lucency on XR and CT; reparative new bone/periostitis on XR, CT, and MR; abnormal SI on MR.
Avascular necrosis of the MT head (Frieberg's infraction)	Focal pain along the involved structure	Increased density on XR, CT; irregular contour of the MT on XR, CT, and MR; abnormal marrow SI on MR
Tarsal coalition	Painful flatfoot	
<b>Joint Abnormalities</b>		
Metatarsal and toe alignment abnormalities	Deformity and pain of the affected toe; overlying soft tissue swelling along hallux valgus (bunion)	Malalignment of the afflicted ray including hallux valgus, claw toe, hammer toe, mallet toe with or without associated degenerative changes
Osteoarthritis	Pain aggravated by motion and relieved by rest; swelling; decreased of range of motion; IP and 1 <sup>st</sup> MCP >> 2 <sup>nd</sup> – 5 <sup>th</sup> MCP	Osteophytes, joint space loss, joint subluxation, subchondral marrow change including cysts on XR, CT, and MR. DIP and PIP >> MCP
Rheumatoid arthritis	Morning stiffness; synovitis; MCP > PIP >> DIP; positive RF; positive anti-CCP	Demineralization on XR and CT; erosions and joint space loss on XR, CT, and MR; abnormal SI on MR
Crystal arthropathy (gout, CPPD)	Great toe MTP is classic for gout; crystals on joint aspiration; soft tissue masses (tophus)	Calcifications within the soft tissues and chondrocalcinosis on XR and CT; corticated non-marginal erosions with "overhanging edges" on XR, CT, and MR; secondary degenerative changes
Septic arthritis	Swelling; fever and elevated WBC, ESR, or CRP; diabetes	Swelling from joint effusion; loss of joint space, periostitis (with osteomyelitis) on XR; abnormal marrow SI on MR; soft tissue cellulitis or ulcer
Neuropathic arthropathy	Painless swelling and deformity	Joint dislocation, disorganization of the joint, destruction of bone, debris within the joint, and increased density of bone on CT, XR; same with abnormal marrow SI abnormality instead of increased density on MR
<b>Juxta-articular Abnormalities</b>		
Tendinopathy and tendon tear	Pain of the affected tendon (e.g., posterior tibial tendon, peroneal tendons); loss of	None on XR; swelling, increased SI, or discontinuity of the tendon and/or peritendinous fluid on MR

	function from the tendon	
Enthesopathy	Pain at the location of the spur	Heel spur
Plantar fasciitis or sprain	Pain along the bottom of the foot worse with ambulation	(Usually not done.) None on XR; increased SI or discontinuity on MR
Sinus tarsi syndrome	Anterolateral pain; sensation of foot instability	Normal XR and CT; replacement of sinus fat and obliteration of ligament definition on MR
Tailor's bunion	Focal pain and swelling along the 5 <sup>th</sup> metatarsal-phalangeal joint	Focal soft tissue swelling over the 5 <sup>th</sup> MTP; adjacent reactive bone changes on MR
Bursitis	Focal pain at the location of the bursa	(Usually not done.) Normal XR and CT; fluid filled bursa with secondary adjacent bone marrow changes on MR.
Morton's neuroma	Focal pain between the metatarsal heads usually 2 <sup>nd</sup> and 3 <sup>rd</sup>	(Usually not done.) Normal XR and CT; contrast-enhancing focal lesion on MR
<b>FOOT PAIN WITH NO IMAGING FINDINGS ON KNEE IMAGING STUDIES</b>		
Lumbar spine disease (e.g. disc herniation, spinal stenosis); referred ankle pain; tibia or fibular stress fracture proximal to the field of view; aortoiliac insufficiency		
CCP = cyclic citrullinated peptide; CPPD = calcium pyrophosphate dehydrate crystal deposition disease; CRP = c-reactive protein; CT = computed tomography; ESR = erythrocyte sedimentation rate; MR = magnetic resonance imaging; RF = rheumatoid factor; WBC = white blood cell count; XR = plain film radiography		

## REFERENCES

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