

Differential Diagnosis of Acute, Post-traumatic Hand Pain

Cause	Clinical Features	Imaging Findings	Collected Cases
Retained foreign body	History of penetrating wound	Radio-opaque foreign bodies (metal, rocks, glass) are dense on XR and CT whereas wood splinters are 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)	5
Fracture of the phalanges or metacarpals	Pain and tenderness along the involved phalanx or metacarpal; overlying soft tissue defect in open fractures; MOI: direct trauma to the site	Discontinuous cortex and displaced bone fragment on XR, CT and MR; abnormal SI on MR	19
Dislocation of the CMC, MCP, PIP, or DIP joints	Deformity of the dislocated joint; pain and tenderness along the dislocated joint; associated fracture; MOI: direct trauma to the site	Displaced bones on XR, CT, and MR; associated fracture (see above); accompanying ligament or tendon tear (see below)	8
Ligament and tendon tears	Pain and tenderness along the involved structure; joint laxity	Indirect signs (e.g. widening of the scapho-lunate interval) with XR, CT, and MR; swelling and discontinuity of the tendon or ligament on US and MR	4
ABBREVIATIONS			
CMC = carpometacarpal; CT = computed tomography; DIP = distal interphalangeal; MCP = metacarpophalangeal; MR = magnetic resonance; PIP = proximal interphalangeal; MOI = mechanism of injury; SI = signal intensity; US = ultrasound; XR = plain film radiography			

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

Cause	Clinical Features	Imaging Findings	Collected Cases
Bone Abnormalities			
Stress fracture	Repeated local trauma	Focal lucency on XR and CT; reparative new bone/periostitis on XR, CT, and MR; abnormal SI on MR	
Primary and metastatic bone tumors	History of malignancy; pain at the location of the tumor (may be poorly localized); night pain; severe pain not relieved by rest	Destroyed bone cortex, absent trabeculae, associated soft tissue mass on XR, CT, and MR; increased (with blastic) versus decreased (with lytic) bone density on XR, CT; abnormal bone marrow SI with MR	1 enchondroma; 1 cyst; 1 metastatic deposit
Avascular necrosis of the lunate (Keinbock's)	Repeated trauma; loss of motion; weakness	Ulnar minus variant on XR, CT, and MR; dense lunate on XR, CT; small lunate XR, CT, and MR; abnormal SI on MR	
Mallet finger	Fixed flexion at a deformed, painful DIP	Displaced fragment of bone at the insertion of the extensor tendon	
Intra-articular Abnormalities (CMC, MCP, IP)			
Osteoarthritis	Pain aggravated by motion and relieved by rest; swelling; decreased of range of motion; DIP and PIP >> MCP	Osteophytes, joint space loss, joint subluxation, subchondral marrow change including cysts on XR, CT, and MR. DIP and PIP >> MCP	3
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)	Multi-joint involvement; 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	3
Psoriatic arthritis			1
Septic arthritis			1
Juxta-articular Abnormalities			
Dupuytren's contracture	Painless nodular lesions of the palmar fascia; fixed flexion of the ulnar sided fingers	(Usually not done.) Flexion of the ulnar sided fingers on XR, CT, and MR	
De Quervain's tenosynovitis	Radial sided pain and grip weakness	(Usually not done.) Reactive changes along the radial cortex on XR, CT, and MR; thick irregular tendons on MR	1

Torn tendon or ligament	Trauma; pain at the injury site; swelling	Swelling on XR and CT; discontinuity of the tendon or ligament or abnormal SI on MR	
Carpal tunnel syndrome / median neuropathy	Overuse; paresthesias and hypesthesias in the median nerve distribution; positive Tinel test or Phalen maneuver	(Usually not done). Swelling and abnormal SI of the nerve on MR	
Ulnar neuropathy	Paresthesias and hypesthesias of the small finger; prior trauma	(Usually not done.) Deformed Guyon canal from prior trauma on CT or MR	
Tenosynovitis	Diffuse hand and wrist pain; dorsal swelling and inflammatory change	Soft tissue swelling on XR, CT, and MR; fluid in the tendon sheaths and abnormal tendon signal on MR	
Ganglion/tendon cyst	Palpable abnormality along the course of a tendon	(Usually not done.) Soft tissue mass on XR, CT, and MR	1
Complex regional pain syndrome	Diffuse hand and wrist pain; diffuse swelling; hair loss; changes of skin color or temperature	Demineralization on XR and CT; abnormal marrow SI on MR; diffuse abnormal uptake on nuclear medicine bone scan	
Trigger finger	Pain or snapping on flexion of the finger	(Usually not done.) Normal on XR, CT; normal or possibly increased SI of the tendon on MR	
HAND PAIN WITH NO IMAGING FINDINGS ON HAND IMAGING STUDIES			
Referred pain from the wrist; radicular pain from cervical spine disease; trigger finger			
ABBREVIATIONS			
CCP = cyclic citrullinated peptide; CMC = carpometacarpal; CT = computed tomography; DIP = distal interphalangeal; MCP = metacarpophalangeal; IP = interphalangeal; MR = magnetic resonance; PIP = proximal interphalangeal; RF = rheumatoid factor; SI = signal intensity; US = ultrasound; XR = plain film radiography			

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