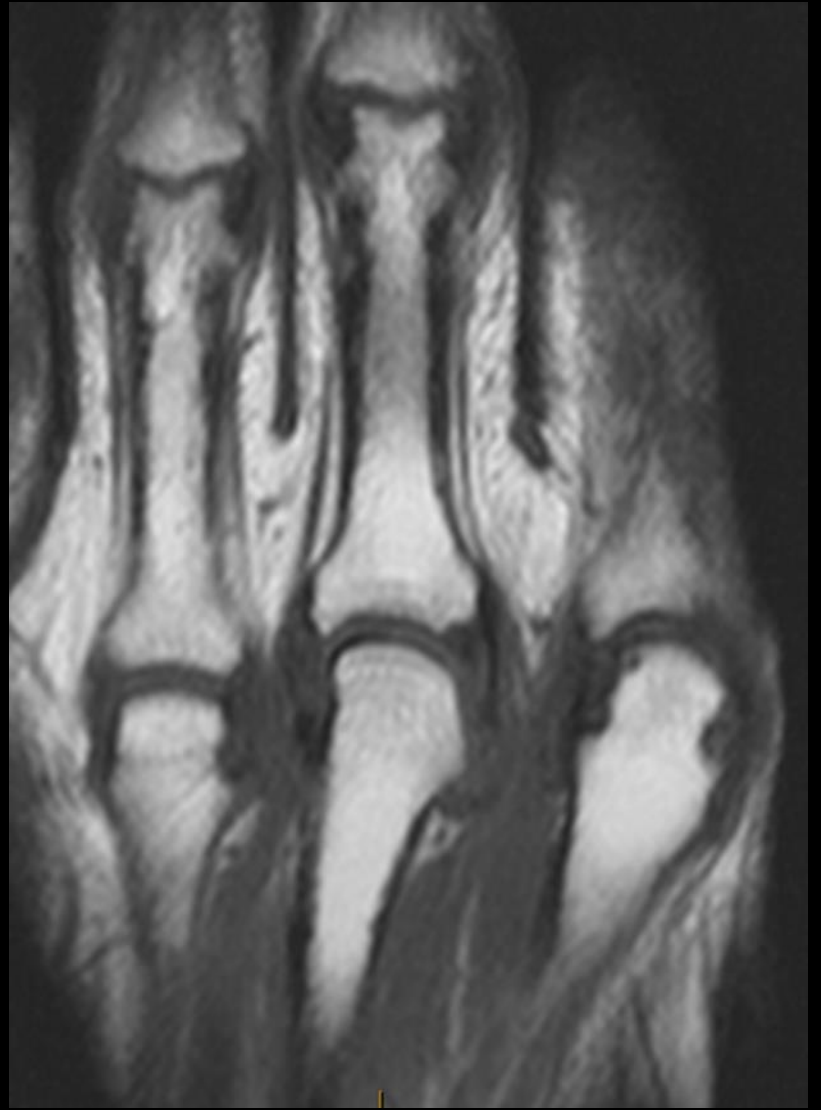
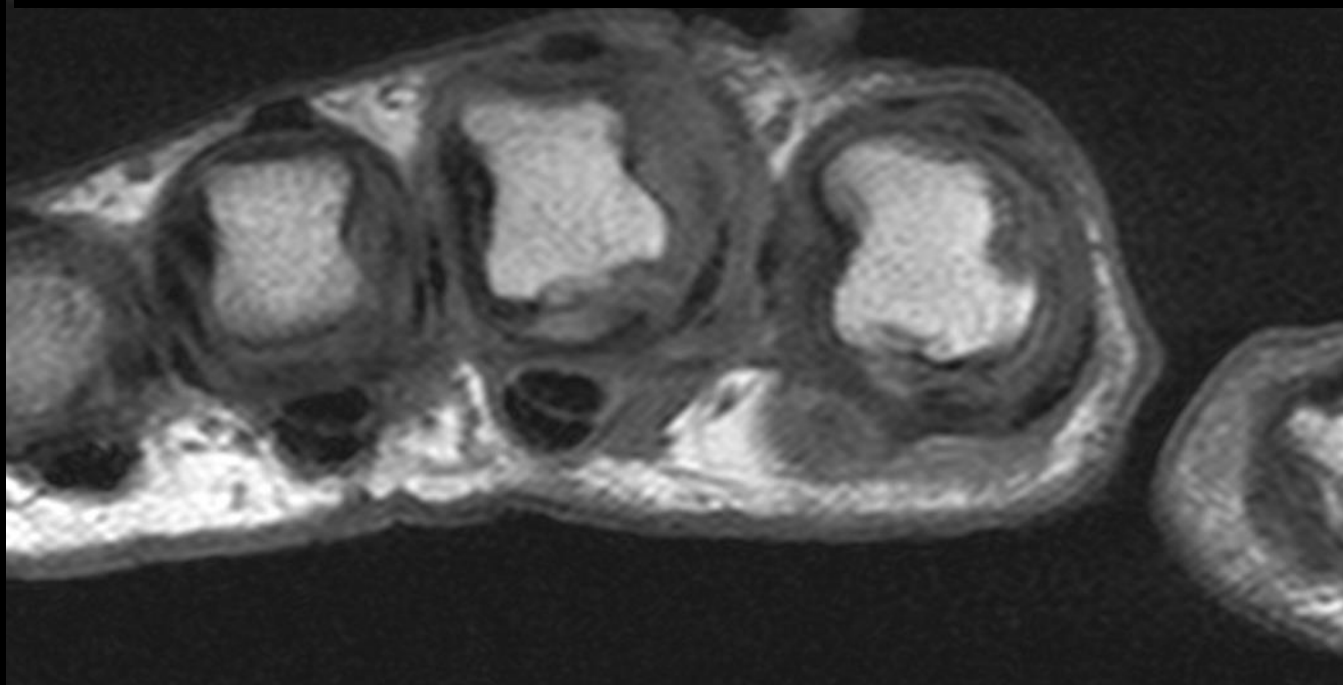
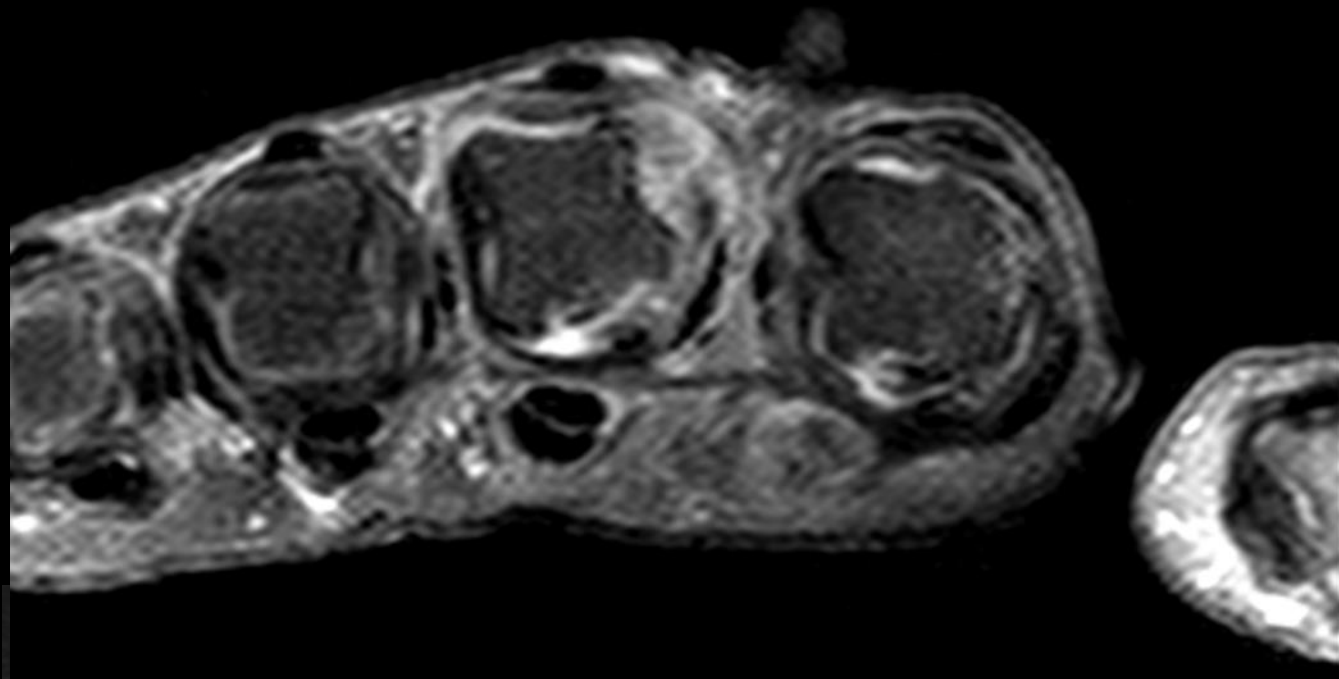




62F, 3rd MCP joint sprain





Diagnosis:

Tear of radial collateral ligament of 3rd finger metacarpophalangeal (MP) joint

****But what about the sagittal bands?**

- Ligamentous injuries to the MP joints should always include assessment for injury to the extensor hood, i.e. “Boxer’s Knuckle”
- Middle finger MP is most vulnerable to Boxer knuckle injury

Boxer's Knuckle

- Defined by damage to the extensor hood, in particular the sagittal bands of the extensor mechanism, resulting in instability of the extensor tendon
- Important to diagnose, as untreated injury can lead to long-term morbidity, such as formation of adhesion or contracture

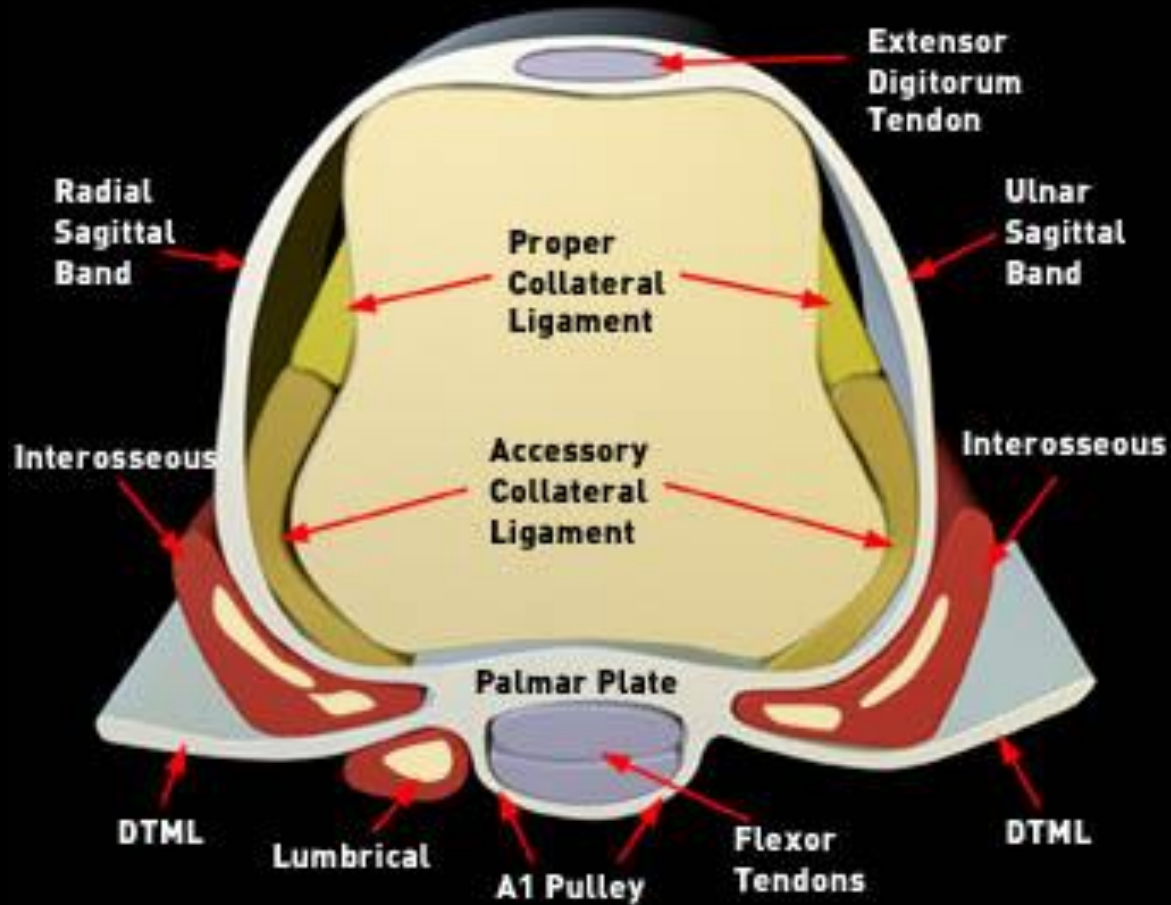
Anatomy

- Extensor hood: aponeurotic sheet overlying MP joint comprised of *central extensor tendon* and two distinct transverse fibers termed the *sagittal bands*.
- Joint capsule is deep to the aponeurotic band

Anatomy

- Sagittal bands together with palmar plate form a closed cylindrical tube surrounding the MC head
- Sagittal bands arise from palmar plate and intermetacarpal ligament at neck of MC bone
- Sagittal bands have superficial thin layer dorsally and thicker deep layer on both sides

Anatomy



Anatomy

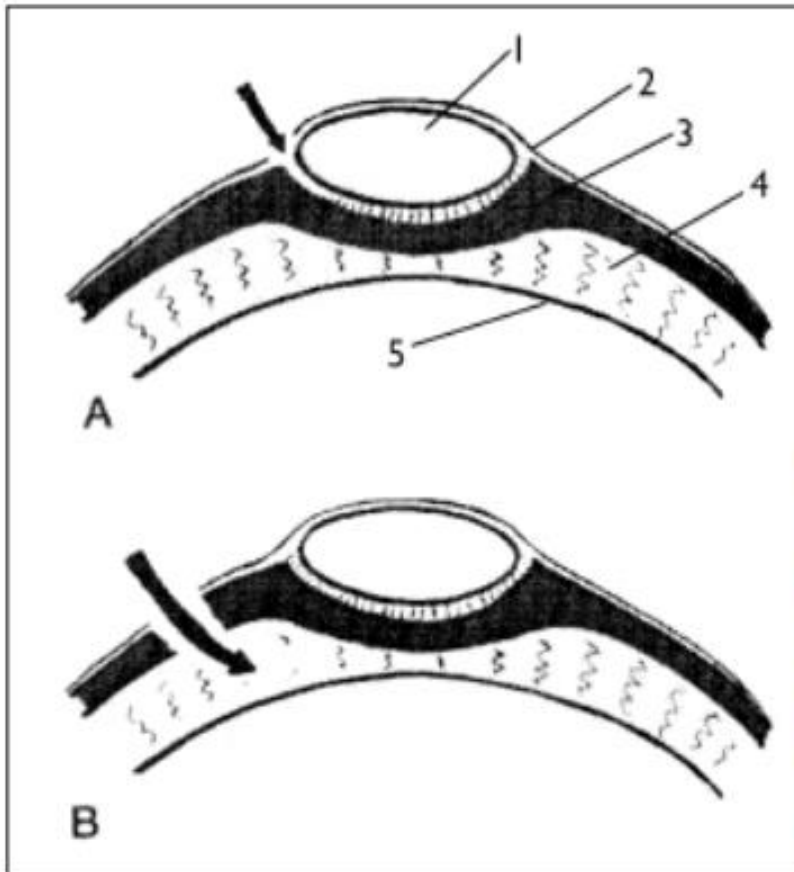


Figure 5. Cross-sectional schema of the extensor apparatus at the level of the metacarpophalangeal joint (reproduced with permission from Ishizuki).⁹ 1=extensor tendon; 2=superficial layer of the sagittal band; 3=deep layer of the sagittal band; 4=loose connective tissue between the sagittal band and the dorsal capsule; 5=dorsal capsule of the metacarpophalangeal joint. **A. Spontaneous (non-traumatic) dislocation.** The thin superficial layer of the sagittal band is ruptured just radial to the extensor tendon. **B. Traumatic dislocation.** Both layers of the sagittal band are ruptured radial to the extensor tendon.

Function

- Sagittal bands stabilize the extensor tendon, holding it in place
- During joint flexion, the radial and ulnar sagittal bands exert tensile forces in opposite directions.
 - Disruption of one side of the sagittal band will result in *unopposed action* of the other side
- Tendon dislocation occurs to the contralateral side of injury (e.g. radial band rupture results in ulnar deviation of the tendon)

Boxer's Fracture

- Usually caused by blunt trauma (e.g. boxing), but can occur spontaneously or with minimal trauma in patients at risk (e.g. RA)
- Symptoms include:
 - Swelling
 - Loss of full extension
 - Extensor tendon dislocation or subluxation
 - Palpable defect at site of disruption

Boxer's Fracture

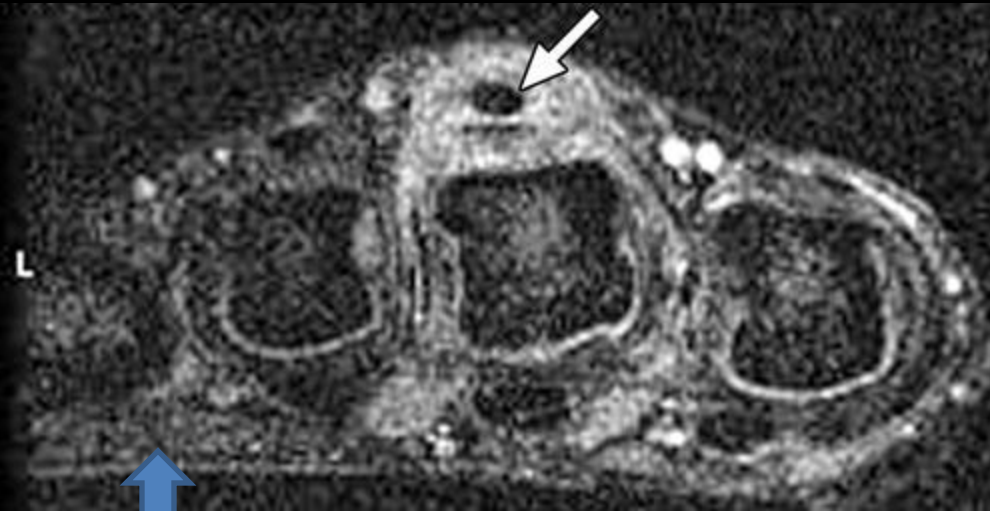
- Spectrum of injuries include:
 - Tears of the sagittal bands, either ulnar or radial
 - Longitudinal tear of the central extensor tendon
 - Collateral ligament injury
 - Contusion
 - Capsular tear
- Clinical manifestation usually sufficient to establish diagnosis, though MRI or US can play an important role when less clinically clear

Cases: photograph



Figure 3. The clinical photo of case 2 showing both hands. The extensor digitorum tendon is subluxed on the left hand as shown by the broken lines. The normal right hand is also shown for comparison.

Cases: 49 M injury to left 3rd MP

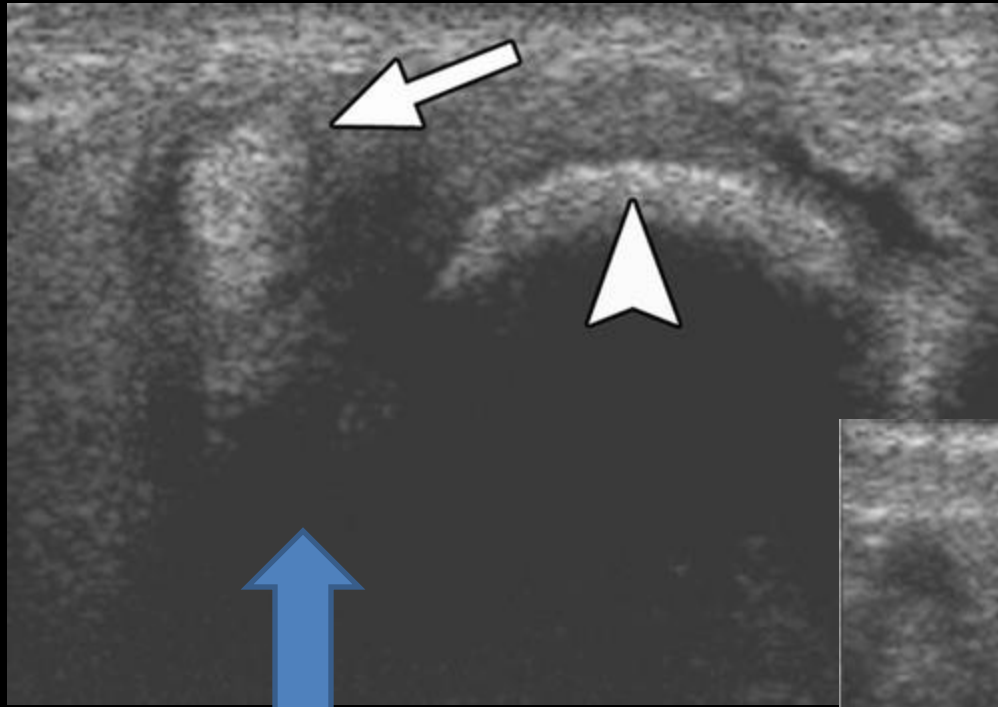


Wrist Extension
(no dislocation depicted)

Clenched fist
(ulnar dislocation becomes evident)

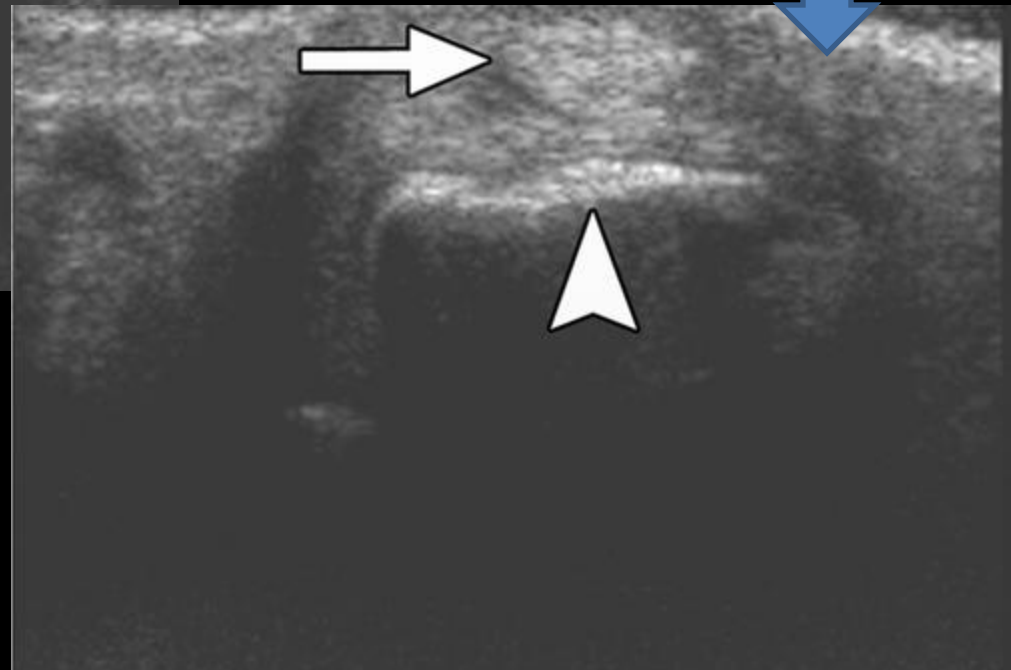


Cases: 26 M injury to right 3rd MP

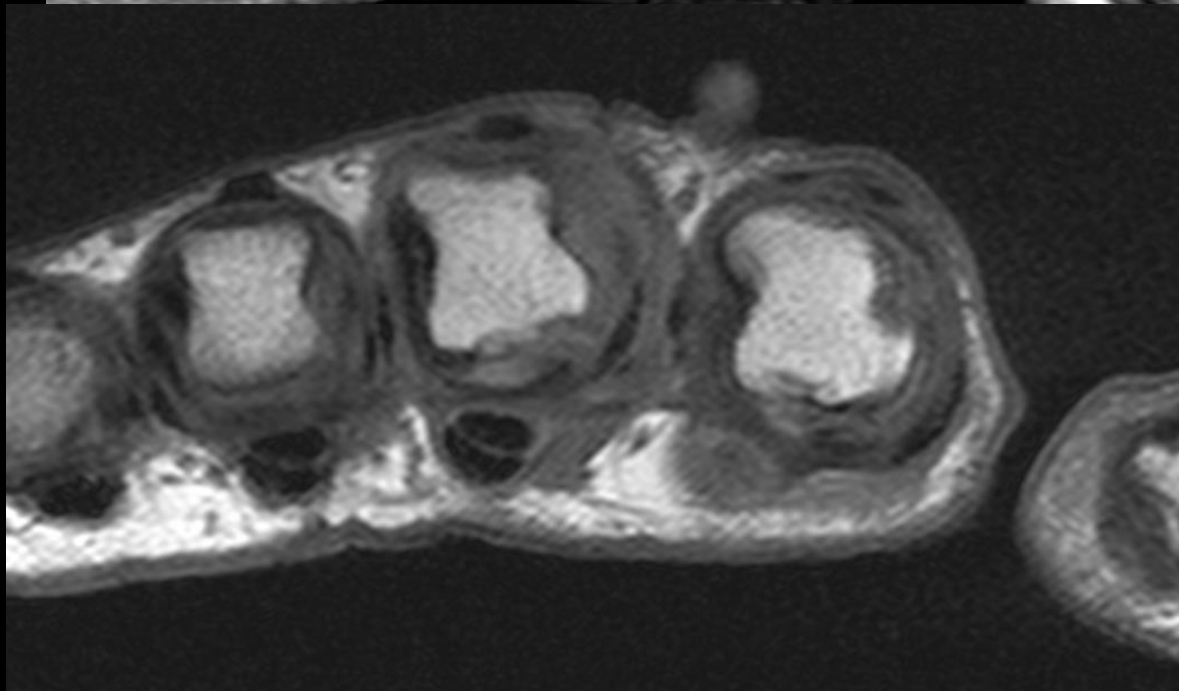
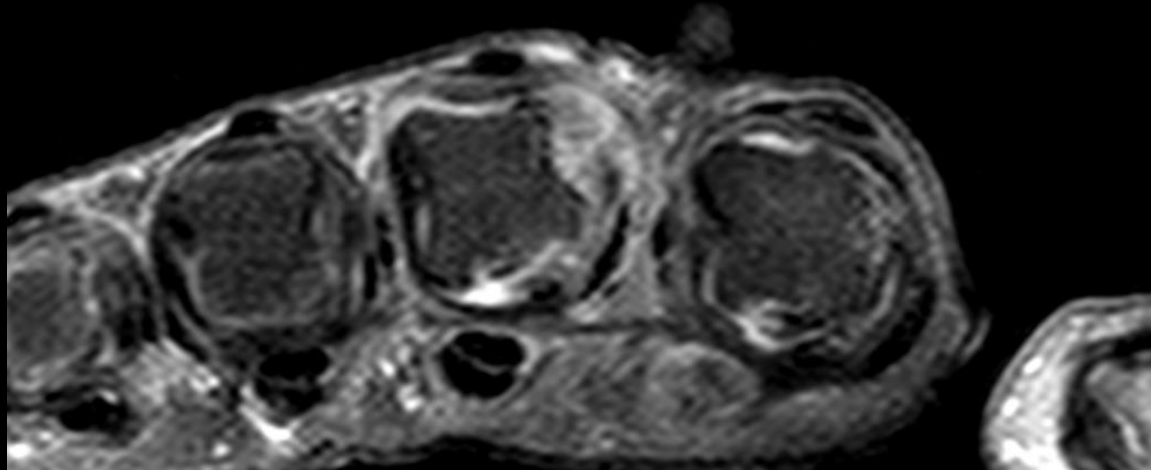


Injured right middle finger in clenched fist position

Asymptomatic left middle finger in clenched fist position



Original Case



Conclusion regarding status of sagittal band on the original case

- No evidence of injury to the sagittal band
- Radial collateral ligament was torn
- The extensor tendon is deviated slightly to the radial aspect. If the radial sagittal band was injured, the extensor tendon would be deviated to the *ulnar* side due to the unopposed tensile traction from the intact ulnar band

Classification of sagittal band injury

- Spontaneous-type usually associated with rupture of superficial layer only
- Traumatic-type usually associated with more severe tearing of both superficial and deep layers

Classification of sagittal band injury

- Classification scheme of three types (Rayan):
 - a) Type 1: simple contusion to extensor mechanism without tear
 - b) Type 2: extensor subluxation with tendon still remaining in contact with condyle of MC head during full MP flexion
 - c) Type 3: dislocation of extensor tendon into the groove between the metacarpal heads

Treatment

- Treatment is controversial, and may be either nonoperative or surgical
- Very little evidence of successful nonoperative treatment in literature
- More severe dislocation of tendon associated with higher rates of nonoperative treatment failure
- Direct surgical repair with realignment of central tendon is usually adequate and very successful

References

1. Lopez-Ben R, Lee DH, Nicolodi DJ. Boxer Knuckle (Injury of the Extensor Hood with Extensor Tendon Subluxation): Diagnosis with Dynamic US-Report of Three Cases. Radiology 2003;228:642-646.
2. KL Mok. Boxer's knuckle of non-boxer patients. Hong Kong Journal of Emergency Medicine 2006; 13: 161 – 167
3. Radsourc. Upper Extremity Sports Injuries. November 2009