

AMSER Case of the Month

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56-year-old male presenting with right wrist pain

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Patient Presentation

CC: 56-year-old male with history of substance use disorder (alcohol, methamphetamine, marijuana), schizophrenia, hepatitis C, and HTN who presented to ED with a right hand injury.

HPI: Patient was twisting lug nuts and pulling on a bar when he felt a popping sensation in his distal radio-ulnar joint (DRUJ). Immediately reduced it and felt better, but continued to experience pain. Presented to ED for continued pain.

Physical Exam: swelling over the right DRUJ with tenderness and pain with rotation. DRUJ is in proper alignment. Normal capillary refill and pulses.

Pertinent Labs

None

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant: 1 Acute blunt or penetrating trauma to the hand or wrist. Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
Radiography area of interest	Usually Appropriate	Varies
US area of interest	Usually Not Appropriate	○
MRI area of interest without and with IV contrast	Usually Not Appropriate	○
MRI area of interest without IV contrast	Usually Not Appropriate	○
Bone scan area of interest	Usually Not Appropriate	***
CT area of interest with IV contrast	Usually Not Appropriate	Varies
CT area of interest without and with IV contrast	Usually Not Appropriate	Varies
CT area of interest without IV contrast	Usually Not Appropriate	Varies

This imaging modality was ordered by the ER physician

Findings (unlabeled)



Findings: (labeled)



Negative XR. No signs of acute fracture or osseous abnormalities

Select the applicable ACR Appropriateness Criteria

Following discharge from the ED, the patient followed up at an outpatient hand clinic for persistent pain, where further imaging was ordered:

Variant: 2 Suspect acute hand or wrist trauma. Initial radiographs negative or equivocal. Next imaging study.

Procedure	Appropriateness Category	Relative Radiation Level
Radiography area of interest repeat in 10-14 days	Usually Appropriate	Varies
MRI area of interest without IV contrast	Usually Appropriate	0
CT area of interest without IV contrast	Usually Appropriate	Varies
US area of interest	Usually Not Appropriate	0
MRI area of interest without and with IV contrast	Usually Not Appropriate	0
Bone scan area of interest	Usually Not Appropriate	***
CT area of interest with IV contrast	Usually Not Appropriate	Varies
CT area of interest without and with IV contrast	Usually Not Appropriate	Varies

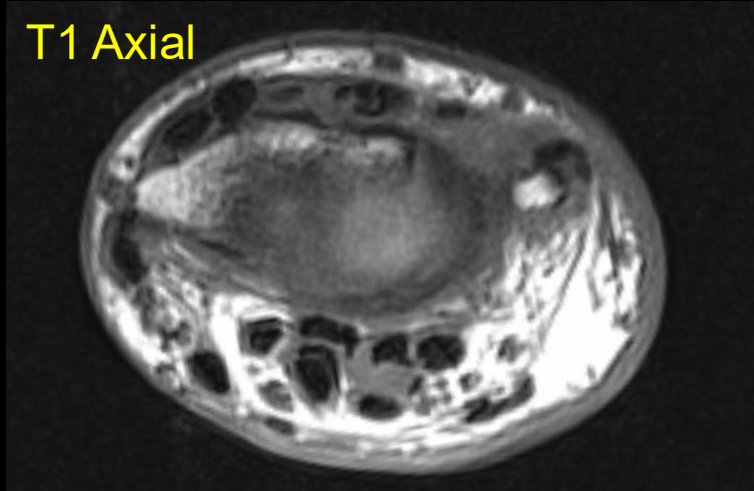
This imaging modality was ordered by the outpatient provider

Findings (unlabeled)

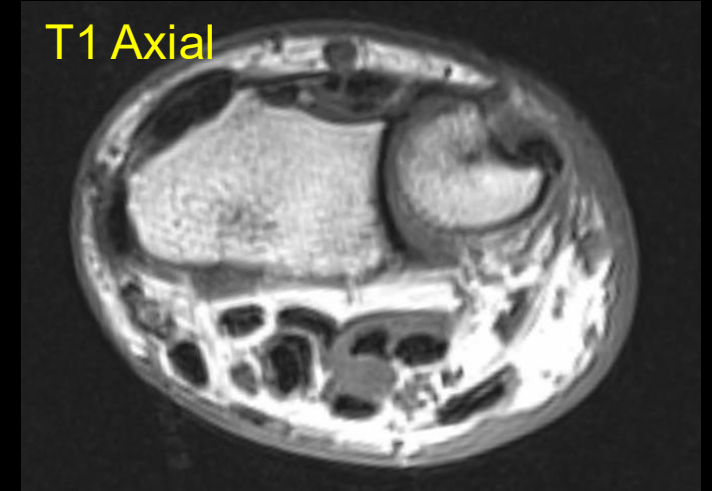
T2 FS Coronal



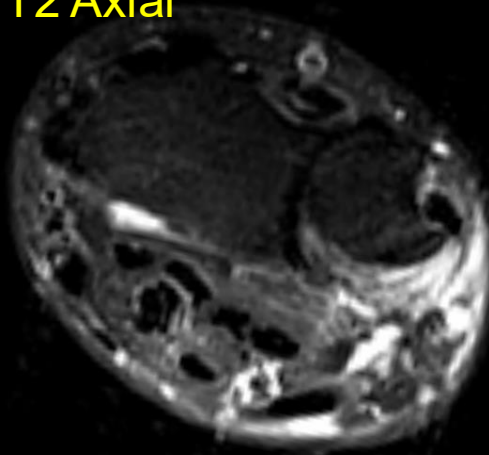
T1 Axial



T1 Axial



T2 Axial



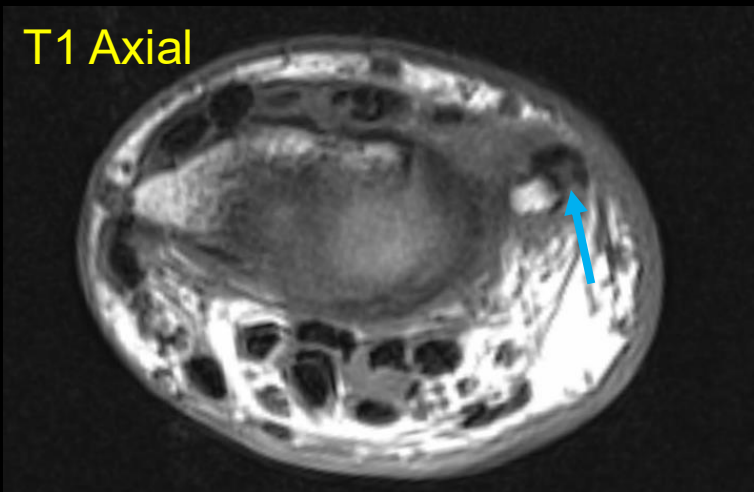
Findings: (labeled)

T2 FS Coronal



Red circle: Hyperintensity at ulnar aspect of wrist indicative of soft tissue edema

T1 Axial



T1 Axial



T2 Axial



Blue arrow: Intermediate intensity within the ECU tendon suggestive of interstitial tearing

Green circles: subluxation of the ECU tendon laterally with associated soft tissue edema (hyperintensities on axial T2) around the ulnar attachment of the ECU subsheath, suggestive of ECU subsheath injury

Final Dx:

Extensor Carpi Ulnaris Subsheath Injury

Case Discussion

Relevant anatomy:

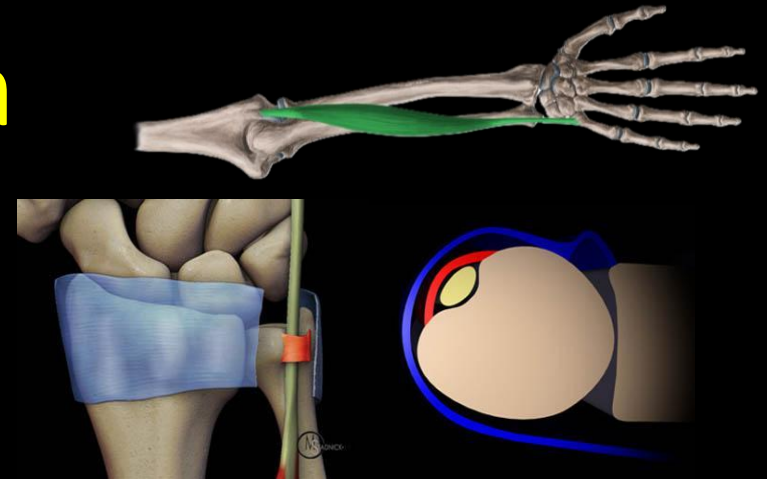
- The ECU originates from the lateral epicondyle of the humerus and attaches to the base of the 5th metacarpal
- Its tendon courses through the 6th dorsal compartment and through a fibro-osseous tunnel formed by the distal ulna and a band of connective tissue known as the ECU subsheath, which stabilizes the tendon within the ulnar groove.

ECU Subsheath injury:

- Injury to the ECU subsheath can cause subluxation of the ECU tendon. This is most commonly caused by sudden supination, wrist flexion, or ulnar deviation, as these motions strain the subsheath by bending the ECU tendon at the site of the subsheath.¹
- A common pattern of injury is stripping of the subsheath at its ulnar attachment, as seen in this case.² In such cases, the ECU tendon typically relocates upon pronation.

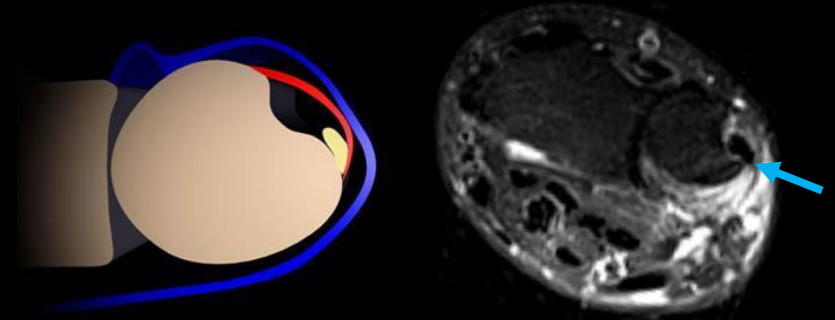
Clinical Presentation:

- Patients typically report a traumatic event with a popping sensation (tendon dislocation) followed by reduction.³
- On physical exam, patients may present with pain on passive supination, tenderness to palpation of the ECU tendon at the distal ulna, and localized swelling.⁴



Normal anatomy: the ECU tendon (yellow) courses between the ECU subsheath (red) and the distal ulna

Image source: <https://radsource.us/extensor-carpi-ulnaris-subsheath-injury/>



Subsheath Injury: stripping of the subsheath (red) at its ulnar attachment creates a false pouch that the ECU tendon can sublux into, as seen in this case (blue arrow)

Image source: <https://radsource.us/extensor-carpi-ulnaris-subsheath-injury/>

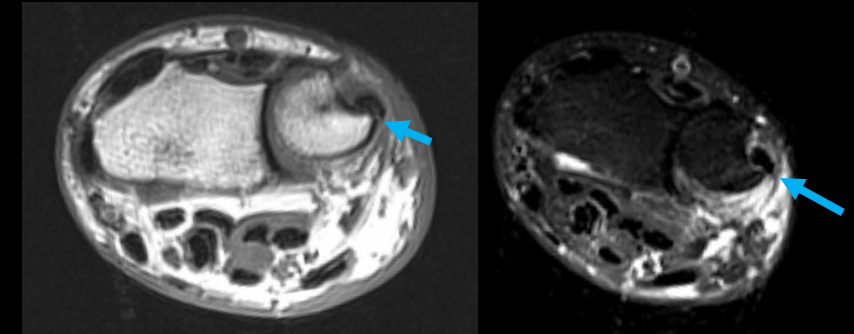
Case Discussion

Diagnosis:

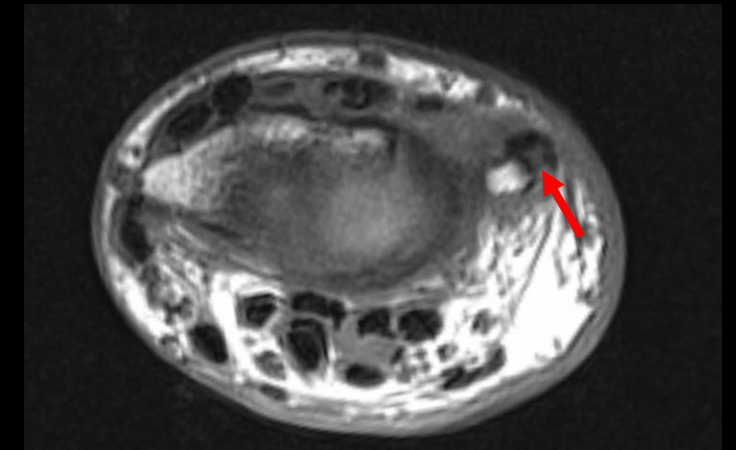
- Physical exam is often nonspecific, requiring imaging for definitive diagnosis.⁴
- XR is usually negative in cases of ECU subsheath injury.⁴
- MRI can establish the diagnosis of ECU subsheath injury. Typical findings include subluxation of the ECU tendon or stripping of the subsheath at its attachments.^{4, 5}
- Increased signal intensity and thickening of the ECU tendon, indicative of interstitial tearing, can also be associated with ECU subsheath injury.⁶

Treatment:

- Treatment begins with conservative therapy of immobilization for 4-6 weeks via casting in wrist extension and radial deviation, which keeps the ECU in its reduced position.⁷ Steroid injections can also be considered for pain management.⁷
- Surgical intervention may be required if conservative management fails.⁷
 - Options include subsheath repair, reforming of ulnar groove, or reconstruction of the subsheath with grafts from the extensor reticulum.⁷



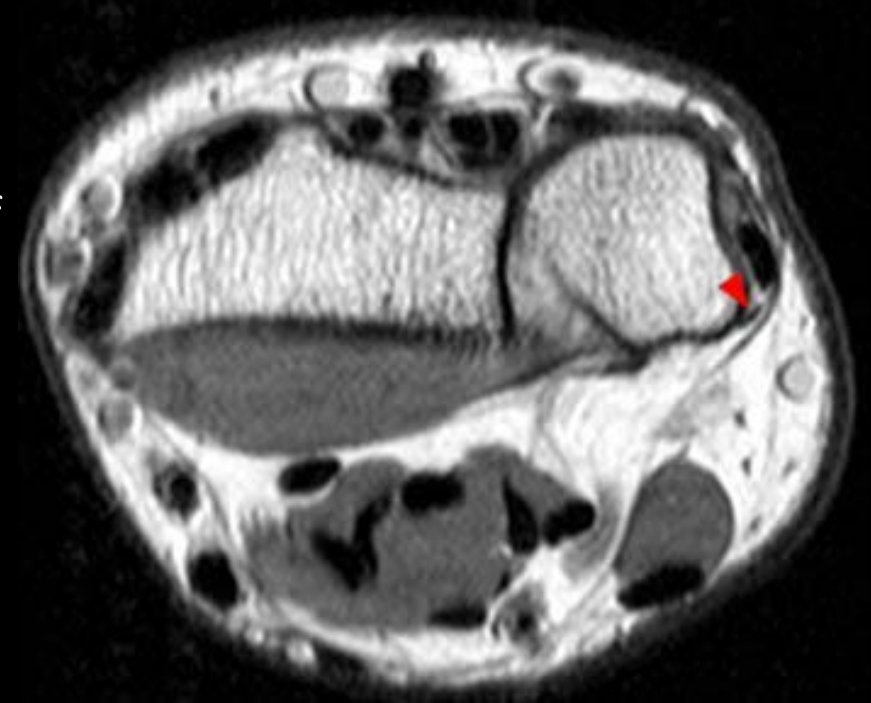
Blue arrows: Subluxation of the ECU tendon seen in this case with stripping of the subsheath at its ulnar attachment



Red arrow: Intermediate intensities indicative of interstitial tearing

Summary

- Ulnar-sided wrist pain is a common clinical complaint. Differentials include ECU tendinopathy, DRUJ or pisotriquetral arthritis, or injuries such as ECU subsheath injury, ECU rupture, or TFCC tear.⁸
- Subsheat injury typically presents after a known traumatic event of supination, wrist flexion, or ulnar deviation with a “popping” sensation, indicative of tendon subluxation, followed by a sensation of reduction.¹
- Ulnar-sided wrist pain and ECU subsheat injury often require imaging for definitive diagnosis, as physical exam can be equivocal.⁴
- XR is usually negative in cases of ECU subsheat injury, requiring MRI for further evaluation.^{4, 5}
- Typical findings on MRI include tearing of the subsheat (commonly at its ulnar attachment), ECU tendon subluxation, and interstitial tearing of the ECU tendon.^{4, 5}
- Initial treatment is conservative with cast immobilization in wrist extension and radial deviation. Surgical repair vs reconstruction can be considered if conservative management fails.⁷



Red arrow: Stripping of the ECU subsheat at its ulnar attachment of, causing the ECU tendon to sublux medially

Image source: <https://radsource.us/extensor-carpi-ulnaris-subsheat-injury/>

References:

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