AMSER Case of the Month October 2025

12 year old male with right wrist pain

Amy Zhou

Case Western Reserve University School of Medicine

Navid Faraji, MD

University Hospitals

Patient Presentation

- 12 y/o male with history of ADHD and autism spectrum disorder who presented to the ED with right wrist pain after an altercation
- Characterization of the Pain
  - Aching, rated 2/10
  - Located at the distal ulna
  - Tender to palpation and with active movement
- Physical Exam
  - Notable for full range of motion at the wrist and digits, 5/5 strength throughout, 5/5 sensation throughout, with tenderness to palpation over the ulnar styloid

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

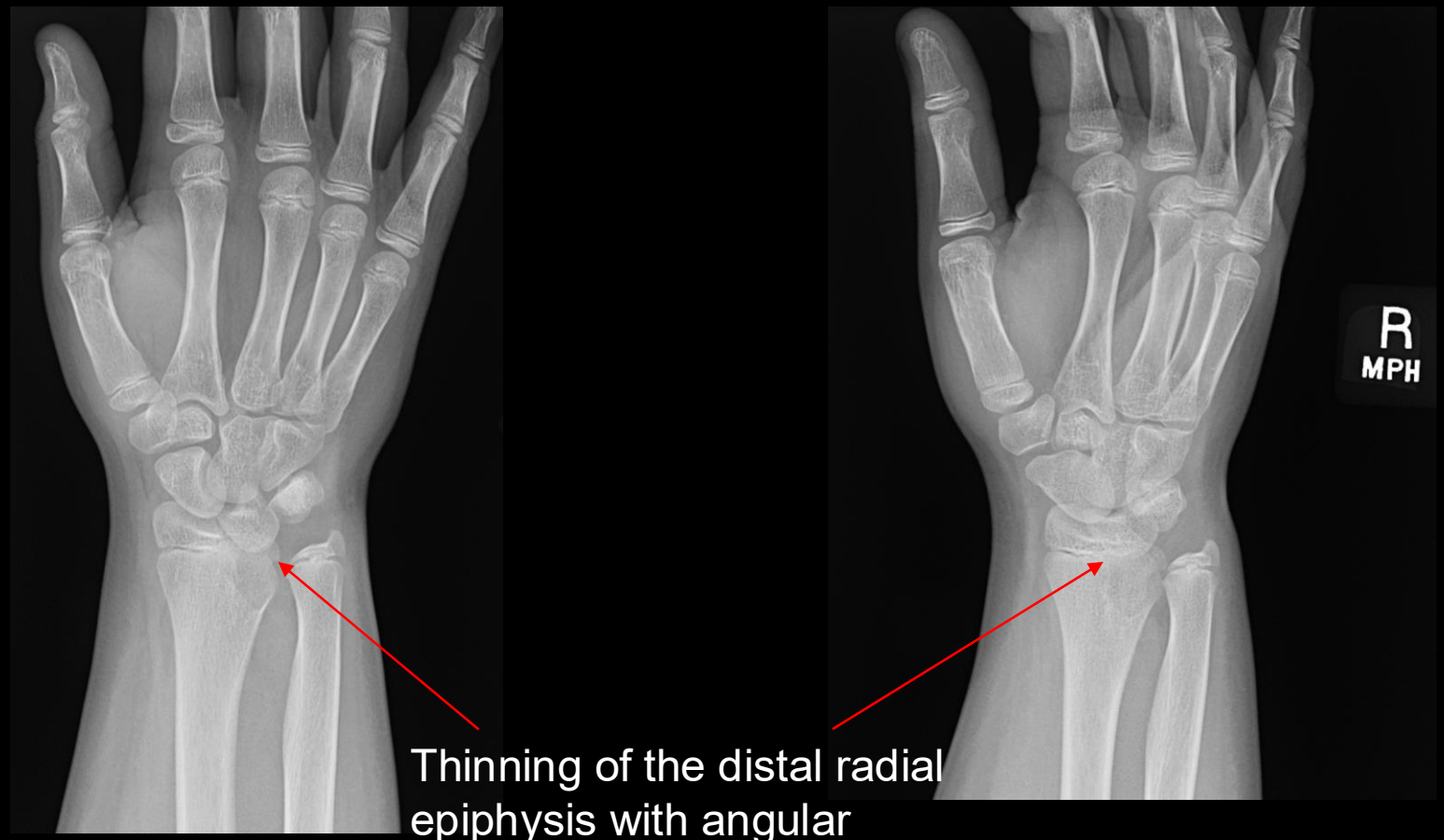
Variant 1: **Acute blunt or penetrating trauma to the hand or wrist. Initial imaging.**

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

This imaging modality was ordered by the ER physician

Findings (unlabeled)

Findings: (labeled)

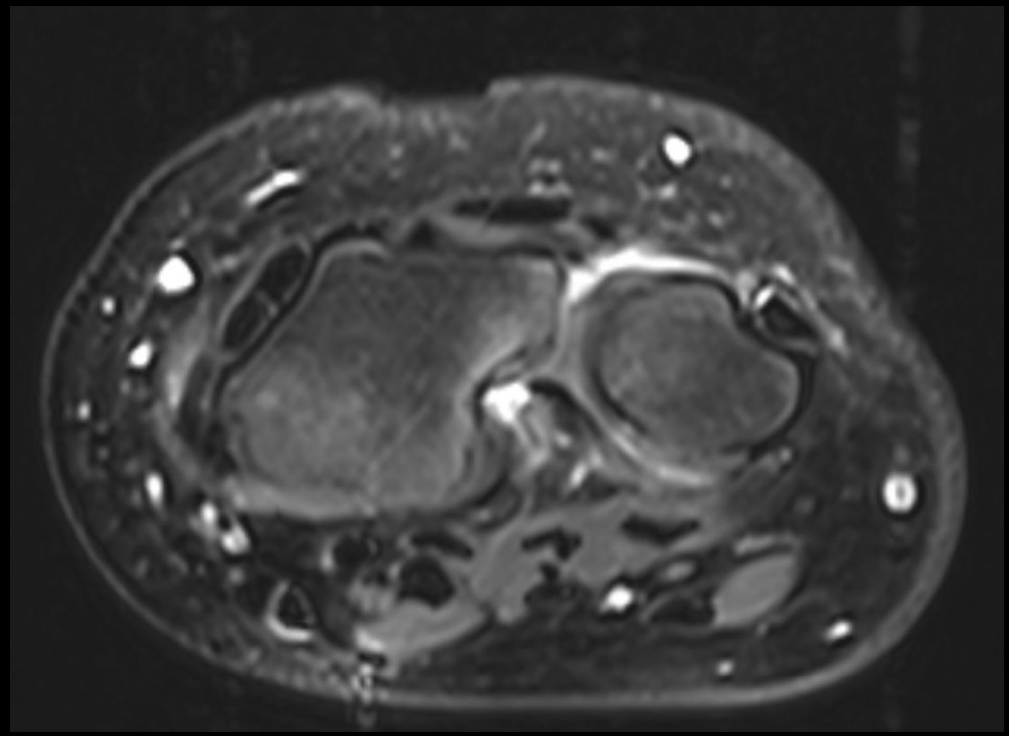


Thinning of the distal radial epiphysis with angular deformity of the underlying radius

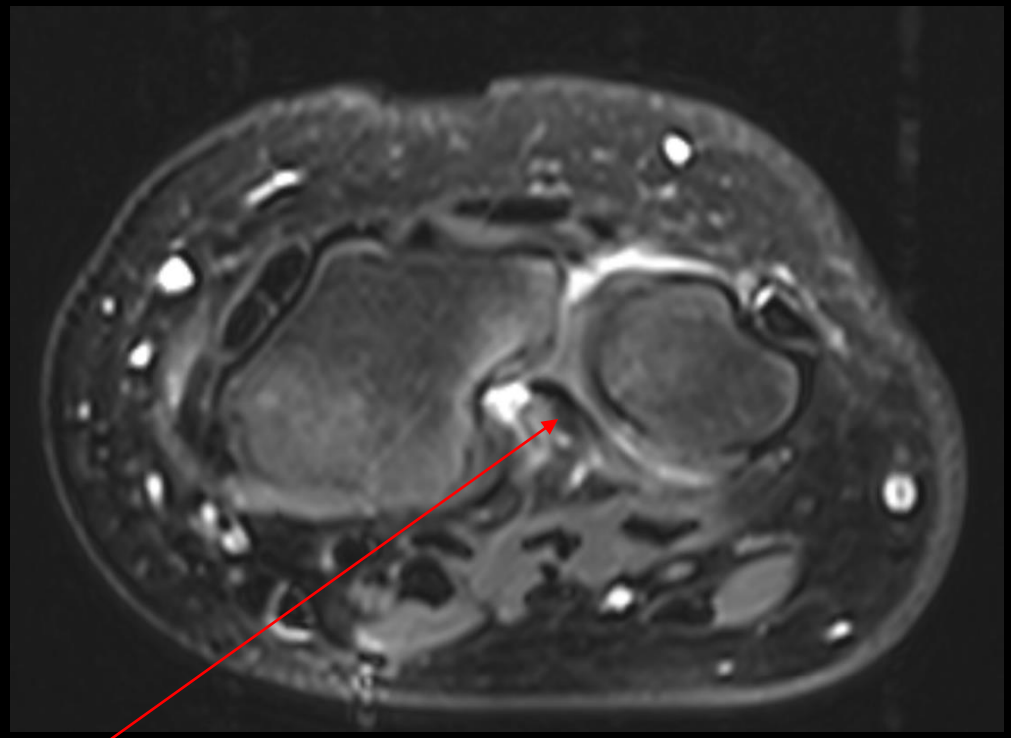
Patient Progress

- Suspected congenital Madelung deformity on radiographs
- MRI was ordered to further characterize the deformity
  - While MRI is not typically recommended to diagnose Madelung's deformity[1], studies have shown its value in differentiating between true Madelung's deformity and Madelung-like deformities by visualizing soft tissue structures, in particular the presence of an anomalous radiolunate ligament (Vickers ligament)[2]

Findings (unlabeled)



Findings: (labeled)



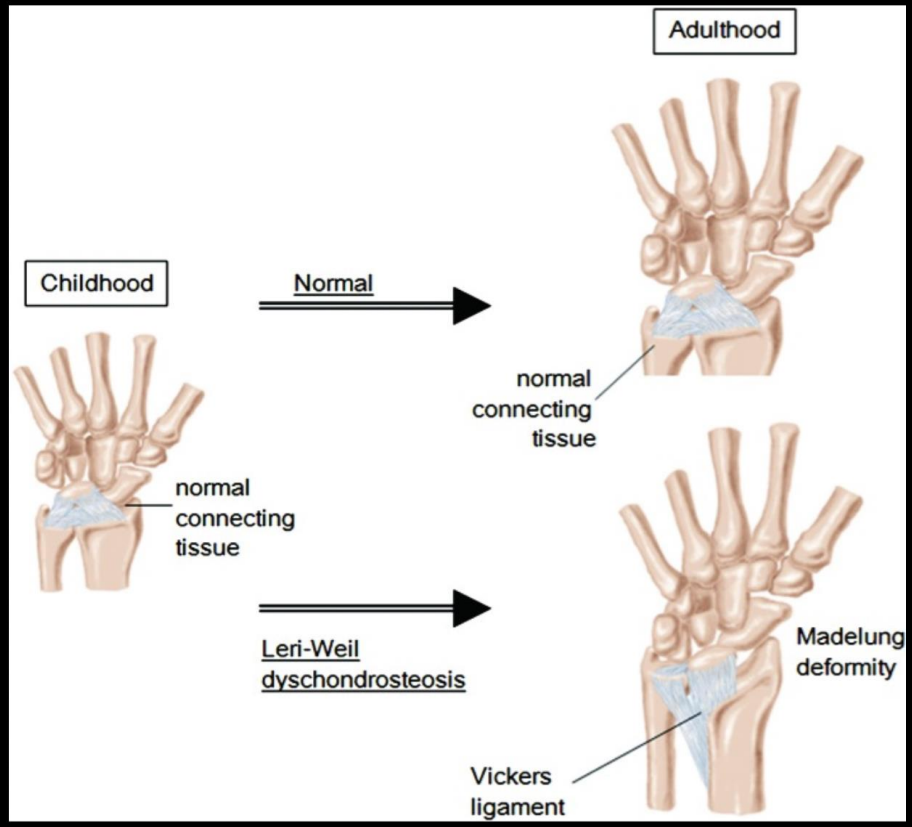
Anomalous volar ligament
(Vikers ligament)

Final Dx:

Madelung’s Deformity

Case Discussion

- Madelung's deformity is a benign condition that can be caused via developmental abnormalities or traumatic disturbances and is typically diagnosed in adolescence, from 8-14 years old[1]
  - It is 4 times more common in females than males
  - The prevalence is rare, consisting of 0.03% of the population
  - Can be associated with other congenital conditions like Leri-Weil dyschondrosteosis and Turner's syndrome
- Etiology[3]: premature closure of the volar-ulnar distal radial growth plate leading to…
  - bowing of the radius and uneven tilt toward the ulna
  - Dorsal displacement of the distal ulna
  - Proximal migration of the lunate
- True Madelung's deformity is associated with Vickers ligament– an abnormally thick radiolunate ligament originating from the radial metaphysis, acting as a tether to limit the growth of the distal radius[4]



Seki A, Jinno T, Suzuki E, Takayama S, Ogata T, Fukami M. Skeletal Deformity Associated with SHOX Deficiency. *Clin Pediatr Endocrinol*. 2014;23(3):65-72. doi:10.1297/cpe.23.65[8]

Case Discussion

- Clinical Presentation[5]
  - Progressive deformity as child is growing
  - Palmar inclination of the wrist
  - Ulnar deviation deformity
  - Limited wrist activity with loss of dorsiflexion
  - Wrist pain
  - Abnormal protrusion of the ulnar head
  - Often can be bilaterally
  - *can present asymptomatically in early stages

Case Discussion

- Prognosis[1]
  - Condition is likely to progress until skeletal maturity is reached
  - However, progression of the deformity is variable
- Treatment/management
  - Asymptomatic to mild symptoms can be managed conservatively via NSAIDs, activity modification and wrist splinting, but progression should still be monitored routinely[6]
  - Severe symptoms can be surgically treated with radial/ulnar osteotomy, radial/ulnar epiphysiodesis, and/or Vickers ligament release
    - Typically associated with good to excellent functional outcomes [7]
- In this case, our patient received a bilateral radial and ulnar epiphysiodesis with resection of Vicker's ligament

References:

1. Saxena TA, Mckie J. Madelung Deformity. In: *StatPearls*. Treasure Island (FL): StatPearls Publishing; December 14, 2023.
2. Ma Y, Guo Z, Wang L, Wang Q, Cheng X, Yan D. Assessment of 3.0 Tesla magnetic resonance imaging in Madelung's deformity: findings and implications. *BMC Musculoskelet Disord*. 2024;25(1):133. Published 2024 Feb 12. doi:10.1186/s12891-024-07245-z
3. Ali S, Kaplan S, Kaufman T, Fenerty S, Kozin S, Zlotolow DA. Madelung deformity and Madelung-type deformities: a review of the clinical and radiological characteristics. *Pediatr Radiol*. 2015;45(12):1856-1863. doi:10.1007/s00247-015-3390-0
4. Farr S, Martínez-Alvarez S, Little KJ, et al. The prevalence of Vickers' ligament in Madelung's deformity: a retrospective multicentre study of 75 surgical cases. *J Hand Surg Eur Vol*. 2021;46(4):384-390. doi:10.1177/1753193420981522
5. Dang Y, Du X, Ou X, Zheng Q, Xie F. Advances in diagnosis and treatment of Madelung's deformity. *Am J Transl Res*. 2023;15(7):4416-4424. Published 2023 Jul 15.
6. Shahi P, Sudan A, Sehgal A, Meher D, Meena U. Madelung Deformity of the Wrist Managed Conservatively. *Cureus*. 2020;12(5):e8225. Published 2020 May 21. doi:10.7759/cureus.8225
7. Steinman S, Oishi S, Mills J, Bush P, Wheeler L, Ezaki M. Volar ligament release and distal radial dome osteotomy for the correction of Madelung deformity: long-term follow-up. *J Bone Joint Surg Am*. 2013;95(13):1198-1204. doi:10.2106/JBJS.L.00714
8. Seki A, Jinno T, Suzuki E, Takayama S, Ogata T, Fukami M. Skeletal Deformity Associated with SHOX Deficiency. *Clin Pediatr Endocrinol*. 2014;23(3):65-72. doi:10.1297/cpe.23.65

AMSER