

# Isolated Capitulum-Trapezoid Coalition: An Unusual Cause of Wrist Pain

Review began 11/21/2023  
Review ended 11/27/2023  
Published 12/02/2023

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## Abstract

Chronic wrist pain presents a diagnostic challenge, demanding a comprehensive understanding of its multifactorial etiology. This case report focuses on wrist coalition, an infrequent orthopedic condition characterized by abnormal articulations between carpal bones, often associated with prolonged wrist discomfort. A 45-year-old man with a two-year history of persistent left wrist pain, with no previous history of trauma or systemic illness, had a localized tenderness in the left carpal region with a restricted range of motion, and diminished grip strength on physical examination. Initial investigations, including autoimmune profiles and plain radiographs, were inconclusive. Magnetic resonance imaging ultimately identified a coalition between the capitulum and the trapezoid. A multidisciplinary team recommended a conservative approach, resulting in a positive response and symptomatic improvement during follow-up. This case report contributes valuable insights to the limited literature on isolated capitulum and trapezoid coalition, highlighting the significance of considering such rare orthopedic entities in the comprehensive evaluation of chronic wrist pain.

**Categories:** Family/General Practice, Radiology, Orthopedics

**Keywords:** trapezoid, capitulum, syndesmosis, carpal coalition, chronic wrist pain

## Introduction

The wrist, a complex joint comprising multiple bones, ligaments, and tendons, is crucial for a myriad of hand movements and functions. Wrist pain is a common complaint encountered in clinical practice, often arising from a myriad of etiologies ranging from traumatic injuries to degenerative conditions [1]. Wrist coalition, typically an embryological anomaly, occurs when the normal segmentation of carpal bones during development is disrupted, leading to fusion and subsequent alterations in joint mechanics [2]. While the literature extensively covers common wrist pathologies, symptomatic coalition-related cases are infrequently reported [1,2]. Understanding and recognizing these rare conditions is crucial for accurate diagnosis and tailored treatment.

The capitulum and trapezoid coalition, as observed in our case, add a distinctive dimension to the spectrum of wrist pathologies. Notably, the challenge lies in diagnosing such anomalies, given their subtle presentation on routine imaging. This case underscores the significance of magnetic resonance imaging in unraveling complex wrist pathologies that may elude conventional diagnostic approaches.

## Case Presentation

A 45-year-old right-handed male presented with a two-year history of persistent left wrist pain. The pain manifested insidiously, gradually worsening over time, and was exacerbated by movement, without any associated history of trauma or systemic illness. Occupational history revealed engagement in repetitive manual tasks. The patient's medical history yielded no remarkable findings, and the social and family history was unremarkable.

Upon examination, localized tenderness was noted over the dorsal aspect of the left wrist, accompanied by a restricted range of motion, particularly in extension and radial deviation. Grip strength was notably diminished, and no signs of systemic inflammation were observed.

Routine blood work, encompassing a complete blood count, erythrocyte sedimentation rate, and C-reactive protein, returned normal results (Table 1). Additionally, rheumatologic markers were negative, and the plain radiograph displayed no significant abnormalities.

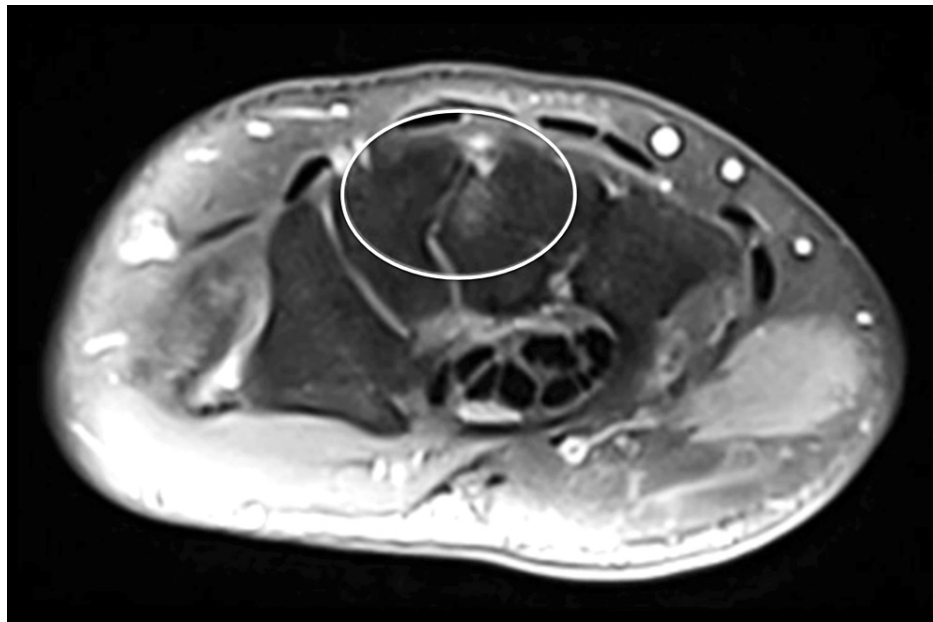
### How to cite this article

Almubarzi A W, Alhussain M A, Alkhteeb N A, et al. (December 02, 2023) Isolated Capitulum-Trapezoid Coalition: An Unusual Cause of Wrist Pain. Cureus 15(12): e49828. DOI 10.7759/cureus.49828

Test	Result	Reference range
Complete blood count (CBC)		
White blood cell count (WBC)	$7.2 \times 10^3/\mu\text{L}$	$4.0 - 11.0 \times 10^3/\mu\text{L}$
Red blood cell count (RBC)	$5.0 \times 10^6/\mu\text{L}$	$4.5 - 5.5 \times 10^6/\mu\text{L}$
Hemoglobin (Hb)	15.0 g/dL	13.5 - 17.5 g/dL
Hematocrit (Hct)	0.452	38.3 - 48.6%
Mean corpuscular volume (MCV)	90 fL	80 - 100 fL
Mean corpuscular hemoglobin (MCH)	30 pg	27 - 33 pg
Mean corpuscular hemoglobin concentration (MCHC)	34 g/dL	32 - 36 g/dL
Platelet count	$300 \times 10^3/\mu\text{L}$	$150 - 450 \times 10^3/\mu\text{L}$
Inflammatory markers		
C-reactive protein (CRP)	0.2 mg/dL	0.0 - 0.5 mg/dL
Erythrocyte sedimentation rate (ESR)	8 mm/hour	0 - 15 mm/hour
Rheumatologic markers		
Rheumatoid factor (RF)	10 IU/mL	0 - 14 IU/mL
Antinuclear antibodies (ANA)	Negative	Negative
Cyclic citrullinated peptide (CCP)	15 U/mL	<20 U/mL
Anti-neutrophil cytoplasmic antibodies (ANCA)	Negative	Negative

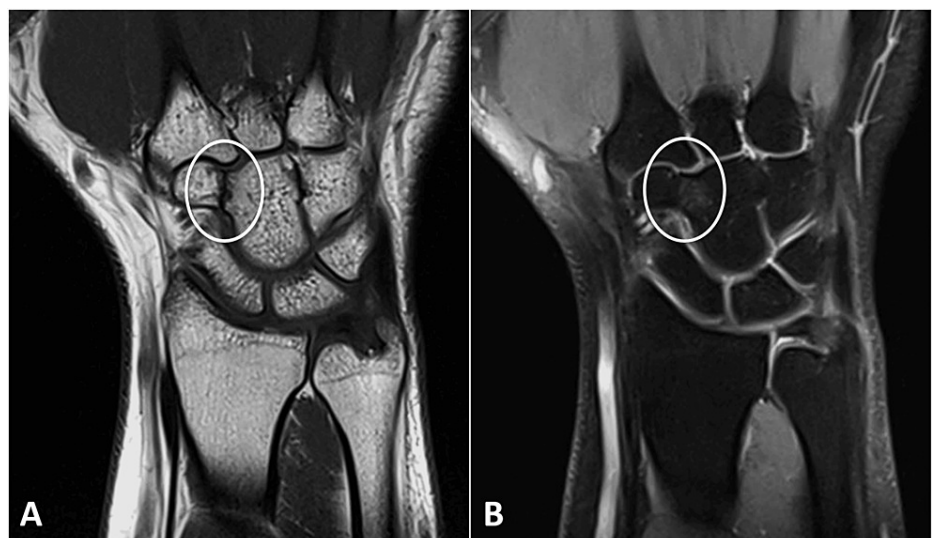
TABLE 1: Laboratory test results.

The differential diagnosis initially considered ligamentous injury, inflammatory arthropathy, and avascular necrosis. However, further investigation through magnetic resonance imaging revealed an anomalous articulation between the capitulum and the trapezoid, consistent with a coalition (Figures 1, 2).



**FIGURE 1: PD-weighted axial MRI image of the left wrist showing the abnormal fibrous coalition (encircled) between the capitulum and the trapezoid.**

PD: proton density; MRI: magnetic resonance imaging.



**FIGURE 2: Coronal MRI images of the left wrist are displayed, featuring T1-weighted (A) and PD-weighted (B) images. The illustrations depict the abnormal fibrous coalition (encircled) between the capitulum and the trapezoid, with minimal bone edema noted.**

PD: proton density; MRI: magnetic resonance imaging.

A multidisciplinary team, comprising orthopedic surgery, rheumatology, radiology, and physiotherapy, recommended a conservative approach involving analgesics with paracetamol and non-steroidal anti-inflammatory drugs, splinting, and physiotherapy. Surgical intervention would only be contemplated if symptoms persisted or worsened. Subsequent follow-up appointments revealed a positive response to conservative management, with partial resolution of pain and a decreased analgesic requirement. Furthermore, the physical examination showed an improved range of motion and grip strength. The patient's progress continues to be closely monitored to ensure sustained improvement and address any

emerging concerns.

## Discussion

Chronic wrist pain remains a complex clinical presentation, often necessitating a thorough exploration of diverse etiologies [1]. Our case emphasizes the crucial role of careful evaluation in identifying unusual causes of persistent wrist pain. Conventionally, ligamentous injuries, inflammatory arthropathies, and avascular necrosis are common etiologies for wrist pain [1]. However, our case prompts consideration of rare structural anomalies, particularly carpal coalitions, when plain radiographs were unremarkable.

Carpal coalitions, defined as abnormal unions between adjacent carpal bones, present a diagnostic conundrum [2]. While previous literature has extensively documented common wrist pathologies, reports on carpal coalitions, particularly isolated capitulum and trapezoid coalitions, are notably scarce [3,4]. The wrist's anatomy, characterized by a complex network of ligaments and articulations, makes it susceptible to subtle aberrations that can manifest as chronic pain.

Understanding the diverse types of carpal coalitions is imperative. Coalitions can manifest between various carpal bones, including the lunate and triquetrum, hamate and capitate, or, as in our case, the capitate and trapezoid [2]. The classification of carpal coalitions encompasses syndesmotoc and synostotic types. Syndesmotoc coalitions involve fibrous connections between bones, while synostotic coalitions signify bony unions [2]. Our case, revealing synostosis between the capitulum and trapezoid, exemplifies the latter. The distinction between these types holds clinical relevance, influencing the prognosis and therapeutic approach. Syndesmotoc coalitions may allow for greater mobility and response to conservative measures, while synostotic coalitions often necessitate more judicious management, considering the potential impact on joint function and adjacent soft tissues [5].

In our patient's case, the decision for conservative management aligns with existing evidence supporting non-surgical approaches for selected instances of carpal coalition. The multidisciplinary team's recommendation of analgesics, splinting, and physical therapy aims to alleviate symptoms and improve wrist function. However, the potential for surgical intervention remains a consideration, particularly if symptoms persist or worsen.

## Conclusions

In conclusion, chronic wrist pain demands a comprehensive diagnostic approach that considers not only common pathologies but also rare structural anomalies like carpal coalitions. The complex anatomy of the wrist, combined with the varied types of coalitions and their potential clinical implications, requires clinical judgment and advanced imaging for accurate diagnosis. Our case report contributes to the limited literature on isolated capitulum and trapezoid coalition. As our understanding of these entities evolves, this case adds valuable insights to the broader discourse on wrist pain and carpal coalitions, guiding clinicians in navigating the complexities of diagnosis and management.

## Additional Information

### Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

**Concept and design:** Alwaleed M. Mohammed, Waad D. AlOtaibi

**Acquisition, analysis, or interpretation of data:** Alwaleed M. Mohammed, Amjaad W. Almubarzi, Mashael A. Alhussain, Nurah A. Alkhteeb

**Drafting of the manuscript:** Alwaleed M. Mohammed, Amjaad W. Almubarzi

**Critical review of the manuscript for important intellectual content:** Alwaleed M. Mohammed, Mashael A. Alhussain, Nurah A. Alkhteeb, Waad D. AlOtaibi

**Supervision:** Alwaleed M. Mohammed

## Disclosures

**Human subjects:** Consent was obtained or waived by all participants in this study. Ministry of Health Ethics Committee issued approval Exempt. The case report was exempted from ethical approval by the Institutional Review Board Committee. Written informed consent was obtained from the patient for the publication of the case report and accompanying images. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All

authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

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