Conservative management of triquetral tractures: 4 Case Series

Jesus Alejandro Olvera Rodriguez M.D.
Elizabeth Del Carmen Rodriguez Rojas M.D.
Amador Jimenez Leyva M.D.
Jesus Omar Hernandez Carrillo M.D.
Erik Beltran Serrano M.D.
Jorge Emmanuel Maldonado Pedromo M.D.

Nuevo León, Mexico

Case Report

Plastic Surgery

OPEN ACCESS

Background: Pyramidal (triquetral) bone fractures are the second most frequent carpal injuries but are often underdiagnosed due to nonspecific presentation and low radiographic sensitivity.
Methods: We conducted a retrospective case series of four adult patients with non-displaced dorsal triquetral fractures confirmed by lateral wrist radiographs. All were treated conservatively with immobilization and physiotherapy. Clinical outcomes and radiographic healing were assessed over a minimum follow-up of 10 weeks.
Results: All patients achieved complete fracture healing, full recovery of wrist function, and absence of pain or instability. No complications or surgical interventions were required.
Conclusion: Conservative treatment is a safe and effective approach for stable dorsal triquetral fractures. Accurate diagnosis relies on clinical suspicion and appropriate imaging. Early recognition and immobilization contribute to favorable outcomes. Further studies are needed to establish standardized management protocols.

Keywords: Triquetral fractures, carpal fractures.

Triquetral, or pyramidal, bone fractures are the second most common carpal fractures after scaphoid injuries (1,2). These fractures are typically classified into three groups: dorsal cortical, body, and volar cortical fractures (2,3). Detecting triquetral fractures on plain radiographs can be challenging, making early diagnosis in emergency settings difficult. Consequently, they may go unnoticed and be identified later, delaying treatment (3,4). Depending on the fracture type, complications may include painful pseudoarthrosis, persistent carpal instability, and pisotriquetral joint arthritis (3). Several studies have reported that older age is associated with delayed bone healing and less favorable outcomes (4,6). However, specific information explaining the consolidation delay in triquetral fractures remains scarce (4). In contrast, carpal instability is often suspected in younger patients with poor evolution (3,4). The patient profile, including age and mechanism of injury, may influence the fracture type, potential complications, and treatment approach (3,4). Most triquetral fractures are treated satisfactorily with conservative immobilization, except in complex cases with associated injuries or persistent symptoms (4,6). The small number of documented cases and the limited level of evidence in the literature make it difficult to provide clear and updated guidelines for diagnosis and treatment (4,6). This is particularly evident when considering the role of high-resolution imaging, accurate detection of associated lesions, and individualized conservative management strategies to improve outcomes in this uncommon injury.

Methods

We conducted a retrospective observational study including four adult patients diagnosed with dorsal triquetral fractures between March 2021 and March 2025 at the Plastic and Reconstructive Surgery Department of Hospital Regional Adolfo López Mateos. Inclusion criteria were age over 18 years, clinical and radiological confirmation of a non-displaced dorsal triquetral fracture (1–3), conservative treatment, and a minimum follow-up period of three months (4,6). Exclusion criteria included open fractures, multiple carpal injuries, or incomplete records preventing functional assessment (4,6). Data were collected from medical records and radiographic studies. Variables analyzed included patient demographics, mechanism of injury, radiographic findings, treatment approach, and clinical outcomes (3,4,6). Fracture healing was defined as complete resolution of fracture lines on radiographs and absence of pain on palpation and motion.

From the General Surgery Department at Clinica Hospital Constitución Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado, Monterrey, Nuevo Léon, México. Received on July 5, 2025. Accepted on July 11, 2025. Published on July 12, 2025.

DOI 10.5281/zenodo.15872166

Case	Age (years)	Sex	Mechanism of Injury	Radiographic Findings	Treatment	Time to Recovery
1	48	Female	Fall onto extended hand in hyperextension	Non-displaced dorsal cortical fracture ("pooping duck" sign)	4 weeks plaster immobilization + 2 weeks orthosis + physiotherapy	12 weeks
2	60	Male	Fall onto outstretched hand	Non-displaced dorsal avulsion fracture	4 weeks immobilization + physiotherapy	12 weeks
3	50	Male	Fall onto extended hand	Linear non-displaced dorsal fracture	4 weeks immobilization + orthosis + rehabilitation	10 weeks
4	62	Male	Fall onto extended hand	Non-displaced dorsal cortical fracture	4 weeks immobilization + physiotherapy	12 weeks

Table 1. Age and sex distribution.

Case 1

A 48-year-old female with no relevant medical history presented to the emergency department with acute pain and functional limitation in the right wrist following a fall in forced dorsal hyperextension. Physical examination revealed localized dorsal edema, significant reduction in active and passive motion due to pain, and no neurovascular compromise. Radiographs demonstrated a non-displaced dorsal cortical triquetral fracture, characterized by the "pooping duck" sign. The patient was treated with a short-arm plaster cast in intrinsic-plus position for four weeks, followed by a rigid removable wrist orthosis for two additional weeks and supervised physiotherapy. At 12 weeks, she achieved complete recovery without complications.

Case 2

A 60-year-old male sustained a fall onto an outstretched right hand, resulting in acute dorsal wrist pain and swelling. Examination showed tenderness to palpation and motion limitation without neurologic deficits. Lateral radiographs confirmed a non-displaced dorsal avulsion fracture of the triquetrum. Conservative treatment with immobilization for four weeks and subsequent rehabilitation led to full healing and symptom resolution by week 12.

Case 3

A 50-year-old male presented five days after trauma with persistent dorsal wrist pain and decreased range of motion. Imaging confirmed a linear non-

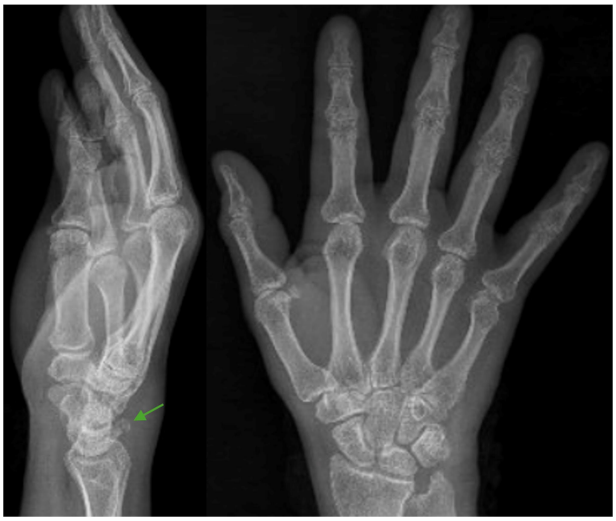

Figure 1. Lateral wrist radiograph showing a non-displaced dorsal cortical fracture of the triquetrum in a 48-year-old female patient. A white arrow indicates the fracture line ("pooping duck" sign).

Figure 2. Lateral projection of the right wrist demonstrating a dorsal avulsion fracture of the triquetral bone without displacement in a 60-year-old male patient. The fracture site is marked by an arrow.

DOI 10.5281/zenodo.15872166

Figure 3. Radiographic image of the left wrist displaying a linear non-displaced dorsal triquetral fracture in a 50-year-old male patient after a fall onto an extended hand. The arrow highlights the fracture line.

displaced dorsal triquetral fracture. Management included plaster immobilization for four weeks, followed by removable orthosis and gradual return to activities. At ten weeks, the patient reported full range of motion without pain or instability.

Case 4

A 62-year-old male with controlled hypertension fell while walking, sustaining forced extension trauma to the right wrist. He presented with severe dorsal pain and functional impairment. Examination showed moderate dorsal swelling and tenderness. Lateral radiographs demonstrated a non-displaced dorsal cortical fracture. Immobilization and physiotherapy resulted in full recovery at 12 weeks without residual symptoms.

Figure 4. Lateral wrist radiograph depicting a non-displaced dorsal cortical fracture of the triquetrum in a 62-year-old male patient. An arrow shows the location of the fracture. No associated carpal injuries are evident.

All patients demonstrated complete fracture healing, absence of pain, and full wrist function at final follow-up evaluations.

Discussion

Triquetral fractures represent the second most frequent carpal bone injuries after scaphoid fractures, accounting for approximately 15% of all carpal fractures (1,2). Most cases are classified as dorsal cortical fractures, typically caused by falls onto an extended and ulnarly deviated wrist (2,3). In our series, all patients sustained dorsal non-displaced fractures consistent with these mechanisms. Early diagnosis remains challenging, as standard posteroanterior radiographs often fail to detect these fractures, leading to delayed identification and treatment (3,4). Lateral and oblique views significantly improve detection rates, especially when the characteristic “pooping duck” sign is present (4,9). Consistent with prior reports, all cases in our series were confirmed radiographically using appropriate projections, avoiding misdiagnosis.

Conservative management remains the preferred approach for non-displaced dorsal triquetral fractures, with immobilization for four to six weeks followed by physiotherapy yielding excellent outcomes (4,6). healing and return to function with this protocol (6, Several studies have reported high rates of bone 7). In our experience, all patients achieved complete recovery without complications, supporting the effectiveness of conservative treatment in this setting.

Nevertheless, delayed union and persistent pain have been described, particularly in older patients or those with associated ligament injuries (4,6). Our series included one patient over 60 years old who recovered fully, but longer-term follow-up would be necessary to assess potential late complications. Additionally, the study was limited by the small sample size and its retrospective nature.

Further prospective studies with larger cohorts are warranted to establish standardized diagnostic algorithms and treatment recommendations. Awareness of the clinical presentation, careful radiographic evaluation, and prompt initiation of immobilization are essential to achieve favorable outcomes and prevent chronic wrist dysfunction (4,6).

Conclusion

Non-displaced dorsal triquetral fractures are frequently underdiagnosed injuries that can be

DOI 10.5281/zenodo.15872166

effectively managed conservatively with immobilization and progressive rehabilitation (4,6). Our case series demonstrated complete radiographic healing and full functional recovery in all patients without complications. Accurate diagnosis relies on high clinical suspicion, understanding of the trauma mechanism, and the use of appropriate radiographic projections to avoid delayed identification (3,4,9). Early recognition and prompt initiation of conservative treatment are essential to prevent chronic pain, instability, and functional impairment (6,7). Further prospective studies with larger samples are needed to validate standardized management protocols and assess long-term outcomes in this frequent but often overlooked carpal fracture (4).

Conflicts of interests

The authors declare no conflicts of interest related to this study.

Acknowledgements

The authors thank the medical and nursing staff of the Plastic and Reconstructive Surgery Department at Hospital Regional Adolfo López Mateos for their collaboration in patient care and data collection. The patients provided verbal informed consent for the use of anonymized clinical information in this report.

References

1. Court-Brown CM, Heckman JD, McQueen MM, Ricci WM, Tornetta III P. Rockwood and Green's Fractures in Adults. 8th ed. Philadelphia: Wolters Kluwer; 2015.
2. William B, Geissler FS, Joseph FS. Fractures of the carpal bones. In: Green's Operative Hand Surgery. Philadelphia: Churchill Livingstone; 2011. p.680–682.
3. Athanasiou V, Panagopoulos A, Iliopoulos ID, et al. Intra-articular fracture of the distal part of the triquetrum within the pisotriquetral joint: case report and literature review. Open Orthop J. 2018;12:84–90.
4. Guo RC, Cardenas JM, Wu CH. Triquetral fractures overview. Curr Rev Musculoskelet Med. 2021;14(2):101–106.
5. Suh N, Ek ET, Wolfe SW. Carpal fractures. J Hand Surg Am. 2014;39(4):785–791.
6. Christie BM, Michelotti BF. Carpal bone fractures. Clin Plast Surg. 2019;46(3):469–477.
7. Höcker K, Menschik A. Chip fractures of the triquetrum: mechanism, classification and results. J Hand Surg Br. 1994;19(5):584–588.
8. Titus SJ, Scott DW. Wrist and hand fractures. In: Seidenberg PH, Beutler AI, editors. The Sports Medicine Resource Manual. Philadelphia: WB Saunders; 2008. p.178–199.
9. Welling RD, Jacobson JA, Jamadar DA, Chong S, Caoili EM, Jebson PJL. CT and radiography of wrist fractures: radiographic sensitivity and fracture patterns. AJR Am J Roentgenol. 2008;190(1):10–16.
10. Mahmood B, Lee SK. Carpal fractures excluding scaphoid in athletes. Clin Sports Med. 2020;39(2):353–371.
11. Smith DK, Murray PM. Avulsion fractures of the volar margin of the triquetrum: a subtle sign of ligament injury. AJR Am J Roentgenol. 1996;166(3):609–614.
12. Gan LP, Satkunanantham M, Sreedharan S, et al. Triquetral fracture with associated pisiform subluxation. Singapore Med J. 2015;56(1):39–41.

Jesus Alejandro Olvera Rodriguez
General Surgery
Clinica Hospital Constitución Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado
Nuevo Léon, México

 DOI 10.5281/zenodo.15872166