Case Report | Journal of Orthopaedic Case Reports 2026 November:16(11):Page 31-36

Second and Third Carpometacarpal Joint Dislocation in a Polytrauma Patient: Successful Closed Reduction and 2-Year Follow-Up

Nabiel Salam[1], Raghavendra Kaganur[1], Anirudh Dwajan[2], S Harshith[1], A Arunachalam[1], Issac Bandi[1]

Learning Point of the Article:

Second and third carpometacarpal joint dislocations are rare injuries that may be missed after high-energy trauma; early recognition through careful clinical and radiographic assessment, assessment of reduction stability to guide conservative or surgical management, and long-term follow-up are essential to ensure maintained joint congruity and detect late complications.

Abstract

Introduction: Carpometacarpal joint dislocations are rare injuries that may be overlooked, particularly in high-energy trauma. Second and third carpometacarpal dislocations are especially uncommon due to the inherent stability of these joints.

Case Report: A man in his 20s sustained second and third carpometacarpal joint dislocations following a high-energy road traffic injury, with an associated femoral head fracture-dislocation. Following urgent management of the hip injury, closed reduction of the carpometacarpal dislocations was performed. Stable anatomical reduction was confirmed clinically and radiographically. The hand was immobilized for 4 weeks followed by structured rehabilitation. At 2-year follow-up, the patient remained pain-free with full function and maintained joint congruity without instability or degenerative changes.

Conclusion: Second and third carpometacarpal dislocations require careful clinical and radiographic assessment, particularly in polytrauma. When stable anatomical reduction is achieved, conservative treatment can provide excellent long-term functional outcomes.

Keywords: Carpometacarpal dislocation, second carpometacarpal joint, third carpometacarpal joint, polytrauma, closed reduction, conservative management.

Introduction

Injuries to the carpometacarpal joints are uncommon and account for only a small fraction of hand trauma cases. They most commonly occur following high-velocity mechanisms, such as road traffic accidents or crush injuries [1,2]. Normally, these joints are resistant to displacement because they are held by strong ligaments and supported by the interlocking configuration of the distal carpal bones and metacarpal bases [3]. The second and third carpometacarpal articulations, form the central structural pillar of the hand and play an important role in maintaining stability during grasp and load transmission. Due to this inherent rigidity, disruption of these joints requires considerable force and is therefore rarely encountered in clinical practice [4].

Such injuries can be difficult to recognize at initial presentation. Swelling can obscure the deformity and clinical signs, which may be subtle at presentation. Furthermore, overlapping bony shadows on radiographs may mask joint incongruity [5]. As a

Access this article online

Website: www.jocr.co.in

DOI: https://doi.org/10.13107/jocr.2026.v16.i11.8378

Author's Photo Gallery

Dr. Nabiel Salam | Dr. Raghavendra Kaganur | Dr. Anirudh Dwajan | Dr. S Harshith | Dr. A Arunachalam | Dr. Issac Bandi

[1]Department of Orthopaedics, Jawaharlal Institute of Post-graduate Medical Education and Research, Puducherry, India,
[2]Department of Orthopaedics, All India Institute of Medical Sciences, Bilaspur, Himachal Pradesh, India.

Address of Correspondence:
Dr. Anirudh Dwajan,
Department of Orthopaedics, All India Institute of Medical Sciences, Bilaspur, Himachal Pradesh, India.
E-mail: anirudhdwajan@gmail.com

Submitted: 21/08/2026; Review: 11/09/2026; Accepted: October 2026; Published: November 2026

DOI: https://doi.org/10.13107/jocr.2026.v16.i11.8378

© The Author(s). 2026 Open Access. This article is distributed under the terms of the Creative Commons Attribution 4.0 International License (https://creativecommons.org/licenses/by-nc/4.0/), which permits unrestricted use, distribution, and non-commercial reproduction in any medium, provided you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. The Creative Commons Public Domain Dedication waiver (http://creativecommons.org/publicdomain/zero/1.0/) applies to the data made available in this article, unless otherwise stated.

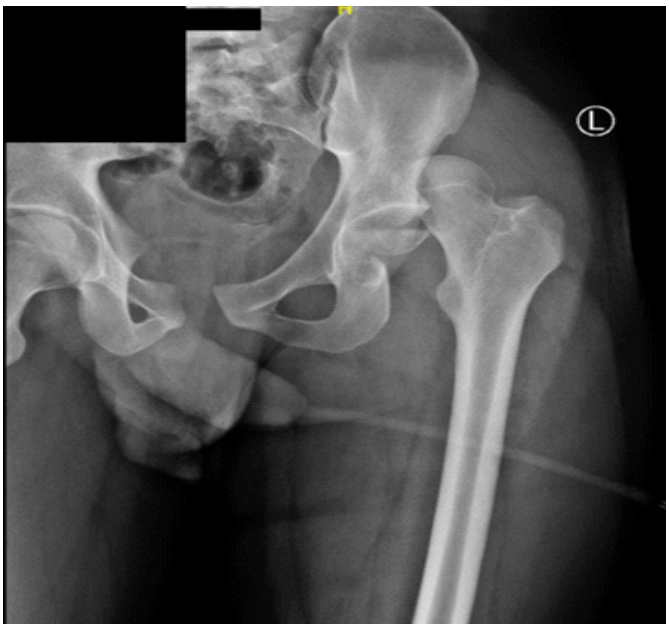

Figure 1: Pre-operative radiograph of the pelvis and left hip demonstrating posterior dislocation of the femoral head relative to the acetabulum, with associated femoral head fracture.

result, carpometacarpal dislocations are well known for being overlooked, especially in patients who have sustained multiple traumatic injuries, in whom attention may be directed toward more obvious or urgent conditions. Delay in diagnosis can lead to persistent pain, reduced grip strength, instability, and later degenerative joint changes. Therefore, careful examination and appropriate imaging are important.

Management strategies for these injuries remain debated. Surgical stabilization is frequently advocated, particularly when instability or associated fractures are present. There is also evidence that stable reductions can be managed successfully conservatively. Reports describing favorable outcomes following both operative and non-operative treatment emphasize that the restoration and maintenance of anatomical alignment are the most important determinants of long-term function [2,5,6,7,8].

Isolated involvement of the second and third carpometacarpal joints is extremely rare, with only a few cases reported in the contemporary literature [8]. Since these injuries are rare and there is a risk of missed diagnosis, they offer valuable clinical insight into recognition, decision-making, and outcome assessment. The present case describes an unusual central carpometacarpal dislocation managed conservatively after stable reduction. This highlights principles that may assist clinicians in evaluating and treating similar injuries.

Case Report

A man in his 20s presented to the emergency department following a high-energy road traffic injury involving a two-wheeler and a larger vehicle. He had no significant medical or surgical history. On arrival, he was conscious, alert, and hemodynamically stable, with severe pain and deformity of the left hip and pain and swelling over the dorsum of the right hand, associated with restricted wrist movement and difficulty gripping objects. There was no numbness, tingling, or digital weakness. Examination revealed diffuse dorsal hand swelling, a subtle contour abnormality over the bases of the index and middle metacarpals, and marked tenderness with bony prominence at this level. Wrist movements were restricted by pain, while sensory and motor functions were intact with no neurovascular deficit. During systematic trauma evaluation, imaging confirmed posterior dislocation of the left hip with an associated femoral head fracture (Fig. 1). The hip was prioritized and reduced under procedural sedation, followed by surgical dislocation and fixation of the femoral head fracture using headless compression screws and a cannulated cancellous screw (Fig. 2). Following stabilization, dedicated radiographs of the right hand demonstrated posterior dislocation of the second and third carpometacarpal joints without associated fracture (Fig. 3). Under sedation, closed reduction was performed using longitudinal traction on the affected fingers, wrist stabilization, and direct pressure over the displaced metacarpal bases. A distinct click was felt, and normal hand contour was restored (Fig. 4). Post-reduction clinical assessment and radiographs confirmed stable anatomical reduction without residual

Figure 2: Post-operative anteroposterior radiograph of the pelvis demonstrating concentric reduction of the left hip joint following safe surgical dislocation and internal fixation of the femoral head fracture with headless compression screws. Joint congruity is restored with no residual subluxation.

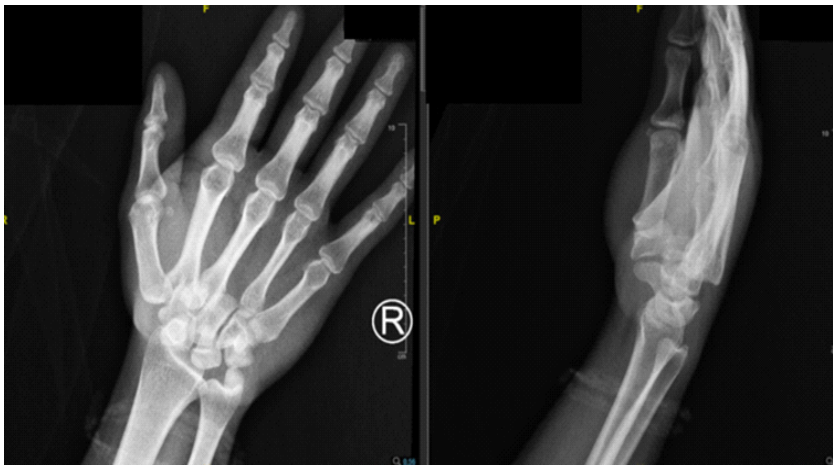

Figure 3: Radiographs of the right hand at presentation. (a) Anteroposterior view showing malalignment and loss of normal joint congruity at the second and third carpometacarpal joints, with disruption of the metacarpal–carpal alignment lines. (b) Lateral view demonstrating dorsal dislocation of the bases of the second and third metacarpals without associated fracture.

subluxation, and surgical fixation was therefore not required. The hand was immobilized in a below-elbow splint with the wrist in a neutral position, with active finger movements encouraged. After 4 weeks, the splint was removed, and structured rehabilitation was initiated. At 2-year follow-up, the patient was pain-free, had full painless wrist and finger movements, and had returned to normal occupational activities (Fig. 5). Radiographs demonstrated maintained joint congruity without late displacement or degenerative changes (Fig. 6). The associated hip injury also healed satisfactorily, with preserved alignment, painless range of motion, and no clinical or radiographic evidence of avascular necrosis or instability.

Discussion

Carpometacarpal joint dislocations are uncommon injuries that usually occur when substantial force is transmitted along the length of the hand, most often during high-energy trauma [2,3]. Their relative rarity reflects the intrinsic stability of these joints, which are reinforced by strong ligamentous structures and the interlocking configuration of the distal carpal row and metacarpal bases [3]. The second and third carpometacarpal joints, in particular, form the central structural pillar of the hand and contribute significantly to stability during grip and load transmission. Because of this biomechanical arrangement, disruption of these central joints requires considerable force and is therefore encountered much less frequently than injuries involving the more mobile ulnar carpometacarpal articulations [4].

Recognition of these injuries can be challenging at initial presentation. Clinical deformity may be subtle, swelling can mask contour abnormalities, and radiographic interpretation requires careful scrutiny of joint alignment rather than simple fracture identification. These injuries are therefore recognized as a potential source of missed diagnosis, particularly in patients with multiple traumatic injuries, in whom attention may be directed toward more obvious or urgent conditions. In the present case, the presence of a major associated injury had the potential to distract from the hand findings, illustrating the importance of systematic examination of all symptomatic areas. Suspicion should be raised whenever there is focal tenderness over the metacarpal bases or an unexplained dorsal prominence following trauma [6].

Management strategies for carpometacarpal dislocations remain largely guided by clinical judgment because high-level evidence is limited and formal treatment guidelines are lacking [7]. In practice, treatment decisions are influenced by the ability to achieve anatomical reduction, the joint's stability after reduction, and the presence or absence of associated fractures. Surgical stabilization is frequently recommended when reduction is unstable or when fractures compromise joint congruity, as fixation may help prevent redislocation and late deformity [5,9]. Conversely, previous reports have demonstrated that stable reductions can be managed successfully without operative intervention, producing satisfactory functional outcomes when alignment is maintained [10]. These findings suggest that post-reduction stability is an important determinant of treatment rather than the injury pattern alone.

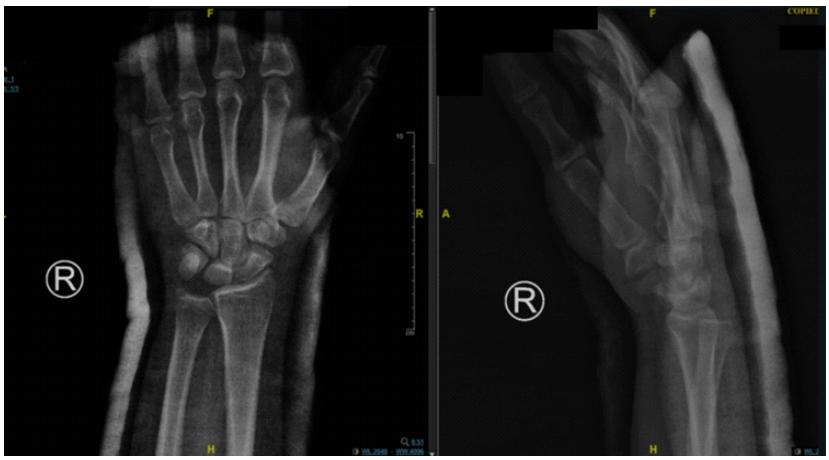

Figure 4: Post-reduction radiographs of the right hand. (a) Anteroposterior view demonstrating restoration of normal alignment and congruity of the second and third carpometacarpal joints. (b) Lateral view confirming maintained reduction without residual dorsal displacement or subluxation.

Figure 5: Clinical photographs obtained 2 years after injury demonstrating functional outcome of the right hand. Images show full finger extension, complete fist formation, preserved wrist flexion, and symmetric palm apposition, indicating restoration of normal range of motion and functional recovery without deformity.

Most published cases describe dislocations of the fourth and fifth carpometacarpal joints or injuries affecting multiple rays, reflecting the greater mobility and susceptibility of these articulations [2,3,11]. Isolated central carpometacarpal dislocations, as in the present case, are distinctly uncommon and therefore provide useful clinical insight. Individual case reports have described a range of treatment strategies, from open reduction with fixation to conservative immobilization, highlighting the absence of a single universally accepted approach [1,4]. The favorable long-term outcome observed in this patient supports the existing literature indicating that when anatomical alignment is restored promptly and stability is confirmed, conservative treatment can result in excellent recovery [6,10]. Nevertheless, conclusions must be interpreted cautiously, as evidence derived from individual cases cannot be generalized. Rather than establishing a definitive treatment

Figure 6: Radiographs of both hands obtained 2 years after injury. (a) Bilateral anteroposterior views showing maintained alignment and congruity of the carpometacarpal joints without degenerative changes. (b) Bilateral oblique views demonstrating preserved joint spaces and normal metacarpal–carpal relationships. (c) Bilateral lateral views confirming stable reduction of the second and third carpometacarpal joints with no dorsal subluxation or late displacement.

recommendation, this report reinforces a practical clinical principle: Carefully selected patients with stable reductions may not require operative fixation, provided that close follow-up is undertaken to ensure maintenance of joint congruity. The applicability of this single case report of a rare injury pattern is limited. The absence of computed tomography and assessment of dynamic stability prevents exclusion of subtle articular abnormalities or instability and determination of the optimal duration of immobilization. There was no assessment of patient-reported outcomes or quality of life. These limitations should be kept in mind when interpreting the favorable outcome at 2 years, and this case adds to the limited evidence supporting conservative management in carefully selected patients with stable anatomic reduction.

This case emphasizes the importance of a diagnostic suspicion for carpometacarpal injuries following high-energy trauma, and the need for a thorough clinical and radiological work-up, and individualized treatment based on an objective assessment of joint stability. These considerations are important to avoid missed injuries and obtain good long-term functional results in this rare but clinically important pattern of hand trauma.

Conclusion

Second and third carpometacarpal joint dislocations are rare injuries that may be overlooked in polytrauma. Early recognition, accurate reduction, and careful assessment of post-reduction stability are essential. In patients with stable anatomical reduction and no associated fracture, conservative management with immobilization and rehabilitation can achieve excellent long-term functional and radiographic outcomes.

Clinical Message

In carefully selected patients with stable anatomical reduction and no associated fracture, conservative treatment with immobilization and rehabilitation can provide favorable long-term outcomes.

Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given the consent for his/ her images and other clinical information to be reported in the journal. The patient understands that his/ her names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Conflict of interest: Nil **Source of support:** None

References

1. Alagesan S, Nagasamy S, Elangovan P, Pandian H, Anantharaman G. An isolated second carpometacarpal joint dislocation treated with open reduction and transfixation with K-wire: A rare case report. Cureus 2024;16:e56338.

2. Żyluk A. Results of the treatment of carpo-metacarpal joints dislocations. Ortop Traumatol Rehabi 2024;26:203-11.

3. Bhardwaj P, Sivakumar BS, Vallurupalli A, Pai M, Sabapathy SR. Fracture dislocations of the carpometacarpal joints of the fingers. J Clin Orthop Trauma 2020;11:562-9.

4. Makino T, Fujioka H, Kokubu T. Neglected fracture dislocation of the second and third carpometacarpal joints: A case report. Hand Surg 2007;12:97-100.

5. Al-Battat MY, Al Hassan MA, Al Qahtani SM. Carpometacarpal dislocation second to fifth with associated hamate fracture: A case report of rare injury. Int J Surg Case Rep 2023;108:108417.

6. Telich-Tarriba JE, Guevara-Valmaña OI, Navarro-Barquín DF, Victor-Baldin A. Carpometacarpal joint dislocations: Management and long-term outcomes at a specialized hand surgery center in Latin America. Plast Surg (Oakv) 2020;28:210-4.

7. Kim JS, Hussain K, Higginbotham DO, Tsai AG. Management of thumb carpometacarpal joint dislocations: A systematic review. J Orthop 2021;25:59-63.

8. Jorgensen C, Christos SC. Carpometacarpal dislocation with third metacarpal fracture. Clin Pract Cases Emerg Med 2021;5:488-90.

9. Ghanem W, Saber A, Najjar J, Ezzeddine H, Badra M, Moucharafieh R. A rare case of multiple carpometacarpal joint fracture-dislocations with fractures of the hamate and capitate. Orthop Res Rev 2025;17:497-502.

10. Jumeau H, Lechien P, Dupriez F. Conservative treatment of

carpometacarpal dislocation of the three last fingers. Case Rep Emerg Med 2016;2016:4962021.

11. Suwannaphisit S, Suwanno P, Fongsri W, Wongsiri S. Multiple carpometacarpal joint fracture-dislocation from the second to fifth: A case report. Ann Med Surg (Lond) 2022;76:103596.

Conflict of Interest: Nil
Source of Support: Nil

Consent: The authors confirm that informed consent was obtained from the patient for publication of this article

How to Cite this Article

Salam N, Kaganur R, Dwajan A, Harshith S, Arunachalam A, Bandi I. Second and Third Carpometacarpal Joint Dislocation in a Polytrauma Patient: Successful Closed Reduction and 2-Year Follow-Up. J Orthop Case Rep 2026 November;16(11):31-36. doi: 10.13107/jocr.2026.v16.i11.8378.