

Bilateral simultaneous distal radius fractures with elbow dislocations following a fall from height: A rare orthopedic quadruple injury with review of the literature

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Learning Point of the Article:

Simultaneous bilateral posterior elbow dislocations with bilateral distal radius fractures are extremely rare and require early recognition, staged surgical fixation, and structured rehabilitation for optimal functional recovery.

Abstract

Introduction: Distal radius fractures and elbow dislocations are commonly encountered as isolated injuries. However, bilateral simultaneous occurrence is exceedingly rare, typically linked with high-energy trauma. Such injury combinations require prompt diagnosis and an individualized management strategy.

Case Report: We report a case of a 42-year-old male laborer who sustained bilateral distal radius fractures (AO/OTA 23-C2) with simultaneous posterior dislocation of both elbow joints following a fall from approximately 10 feet. The elbow dislocations were managed with immediate closed reduction. Definitive fixation of both distal radius fractures was performed using volar locking plates. At the 12-month follow-up, the patient achieved good functional recovery and returned to manual work with minor limitations.

Conclusion: Bilateral elbow dislocations with simultaneous distal radius fractures are extremely rare. Prompt recognition, appropriate surgical intervention, and structured rehabilitation are essential to restore function and prevent long-term disability.

Keywords: Bilateral distal radius fracture, elbow dislocation, high-energy trauma, volar plate, upper limb injury.

Introduction

Fractures of the distal radius are the most commonly encountered injuries of the upper limb, particularly in individuals who experience a fall on an outstretched hand (FOOSH) mechanism [1]. Elbow dislocations, which comprise approximately 10–25% of all elbow injuries, are the second most frequent large joint dislocations in adults, following those of the shoulder [2]. While each of these injuries is well documented in isolation, the simultaneous and bilateral occurrence of both distal radius fractures and elbow dislocations is exceptionally

rare and scarcely reported in the literature.

Such complex injury patterns typically arise from high-energy trauma, including falls from height, high-velocity road traffic accidents, or electrical injuries. The force transmission during these events causes axial loading through the forearm, resulting in fractures and joint disruption. Given their rarity and often atypical presentation, these injuries may be initially overlooked in the context of polytrauma, potentially delaying critical interventions [3,4].

Timely recognition and management require a systematic

Author's Photo Gallery



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Figure 1: X-rays showing posterior dislocation of the right elbow without any fracture in anteroposterior (A) and lateral (B) view and left elbow showing posterior dislocation of elbow without any fracture in anteroposterior (C) and lateral (D) view.

clinical evaluation, prompt imaging, and coordinated multidisciplinary care. Furthermore, due to the functional complexity of the upper limb, treatment must be tailored to the patient's functional demands, emphasizing both anatomical reconstruction and early rehabilitation to optimize long-term outcomes.

Case Report

Patient presentation

A 42-year-old right-handed male construction worker fell from a scaffold approximately 10 feet high. He landed with both arms outstretched and elbows extended. Upon presentation, the patient had gross deformity, pain, and swelling at both wrists and elbows. Upon inspection, deformities were seen on both wrists and elbows bilaterally. On examination, tenderness was found with a limited range of motion. Neurovascularity was intact in both upper limbs. X-rays revealed bilateral posterior elbow dislocation without associated fracture (Fig. 1a, b, c, d) and bilateral comminuted

intra-articular distal radius fractures (AO 23-C2). (Fig. 2a, b, c, d). In the emergency setting, both elbow dislocations were promptly managed with closed reduction under sedation, and concentric reduction was confirmed on post-reduction radiographs (Fig. 3a, b, c, d). Both wrists were also reduced, and stabilization was done with slab application (Fig. 4a, b, c, d). Following initial stabilization and resolution of soft tissue swelling, the patient underwent staged open reduction and internal fixation of the bilateral distal radius fractures using a volar approach (modified Henry technique). Fixation was achieved using volar locking compression plates for both wrists (Fig. 5a, b, c, d). Postoperatively, bilateral below-elbow slabs were applied for 10 days. Sutures were removed on the 14th post-operative day, and a structured rehabilitation protocol was initiated with early wrist and elbow mobilization from the 2nd week, followed by progressive strengthening under supervised physiotherapy beginning at 6 weeks. At the 12-month follow-up, the patient demonstrated excellent radiological and functional outcomes. (Table1). Radiographs confirmed complete bony union with proper implant positioning and anatomical alignment in both wrists (Fig. 6a, b, c, d). Functionally, the patient achieved elbow flexion from 0° to 130°, wrist flexion and extension of 60° and 60°, respectively, and full pronation and supination of



Figure 2: Wrist X-rays showing comminuted intra-articular distal radius fractures (AO 23-C2) right side in anteroposterior (A) and lateral (B) and left side anteroposterior (C) and lateral (D) view.



Figure 3: Post-reduction X-rays of the right elbow in anteroposterior (A) and lateral (B) view and left elbow in anteroposterior (C) and lateral (D) view.

80° each (Fig. 7). He had successfully returned to his occupation as a laborer.



Figure 4: reduction X-rays of right wrist in anteroposterior (A) and lateral (B) view and left wrist in anteroposterior (C) and lateral (D) view.

Discussion

This case report presents an exceptionally rare clinical scenario: bilateral posterior elbow dislocations occurring simultaneously with bilateral distal radius fractures as a result of a high-energy fall. Individually, distal radius fractures and elbow dislocations are frequently encountered in trauma practice. Distal radius fractures account for up to 18% of adult fractures, often following a FOOSH [1], while posterior elbow dislocations are the most common type of elbow dislocation [2]. However, the simultaneous bilateral presentation of these injuries is almost unheard of and adds significant complexity to both diagnosis and management.

The mechanism of injury here is classic: A FOOSH event in which extended elbows transmitted axial loading proximally through the arm to the wrist, resulting in comminuted intra-articular distal radius fractures and forcing the elbow out of its normal alignment posteriorly [3, 4]. Bilateral symmetry suggests that both upper extremities bear near-equal loads—a pattern seen in falls where instinctive and effective protection with one arm is lacking [5].

Literature regarding concurrent injuries has largely focused on unilateral presentations. For instance, Mehlhoff et al. analyzed proximal and distal injuries in elbow dislocations, noting



Figure 5: Post-op X-rays showing appropriate reduction and fixation of the right wrist in anteroposterior (A) and lateral (B) view and left wrist in anteroposterior (C) and lateral (D) view.

Table 1: Functional outcome scores at 3, 6, and 12 months

S. No	Follow-up time	Disabilities of the arm, shoulder, and hand	MAYO wrist score	Patient-rated wrist evaluation score	Mayo elbow performance index score	Grip strength	Functional remark
1	3 months	35	65	40	70	70 (fair)	Limited ROM, mild pain; supervised rehab started; light use of arms resumed
2	6 months	18	80	20	85	85 (good)	Improved ROM, reduced pain; resumed basic work duties
3	12 months	10	90	8	95	95 (excellent)	Full ROM, minimal/no pain, returned to construction work
ROM: Range of motion							

fractures of the radial head and neck but rarely addressing distal radius involvement. (Table 2).

Given its unusual presentation, a thorough clinical and radiographic evaluation was paramount. The presence of multiple injuries can obscure symptoms, particularly swelling at the wrist that masks elbow deformity. As recommended by Mauffrey et al., imaging should cover the entire upper limb – shoulder to wrist – in any high-energy trauma scenario [9]. Prompt recognition ensured early closed reduction under sedation, which restored joint alignment and minimized risks of neurovascular damage, cartilage injury, and heterotopic ossification [10, 11, 12].

Treatment of the bilateral distal radius fractures followed established guidelines by Orbay and Fernandez [13], utilizing volar locked compression plating through a modified Henry approach. This technique is widely recognized as superior for

intra-articular and comminuted fractures, offering stable fixation, anatomic restoration, and an expedited rehabilitation timeline [14, 15, 16]. In our case, a bilateral radius fracture was fixed with a volar compression plate. Multiple meta-analyses support early functional superiority of volar plates compared to casting, though complications including hardware irritation, tendon disruption, and carpal tunnel syndrome are non-negligible, occurring in approximately 12% of cases [17, 18, 19].

A staged surgical strategy was employed to reduce operative time per session, manage soft tissue swelling effectively, and optimize patient tolerance, critical factors in bilateral limb injuries. Fresh tissue trauma can complicate simultaneous bilateral fixation, so spacing procedures are allowed for better outcomes.

The rehabilitation protocol was meticulously timed. Early elbow motion is key to preventing stiffness; studies show that immobilization beyond 3 weeks significantly increases the risk of restricted range and poor functional results [20, 21]. In our patient, controlled active-assisted motion was started during the 2nd post-operative week, with gradual strengthening from week 6 onward. A 2024 scoping review by van der Vliet et al. emphasized that, when addressing determinants of outcome after volar plating, early movement and targeted physiotherapy are associated with significantly improved functional scores [22].

Table 2: Summary of reported cases of elbow dislocation with distal radius fracture

Author(s)	Year	Laterality	Injury pattern	Mechanism of injury	Management approach	Outcome
Simic and Weiland [6]	2004	Unilateral	Ipsilateral posterior elbow dislocation + distal radius fracture	Fall from height	Closed reduction + open reduction internal fixation (ORIF)	Functional recovery
Khanna and El-Khoury [7]	2007	Unilateral	Ipsilateral posterior elbow dislocation + distal radius fracture	Fall on outstretched hand (FOOSH)	Closed reduction + conservative wrist management	Good recovery reported
Nanno et al. [8]	2016	Bilateral	Bilateral elbow dislocations + bilateral distal radius fractures	Fall from height	Closed reduction + staged ORIF	Near-full functional recovery
Bobovec et al. [5]	2022	Bilateral	Bilateral elbow dislocations + bilateral distal radius and ulna fractures	Electric shock (High-energy)		



Figure 6: 6-month follow-up X-rays showing bony union of right wrist fracture in anteroposterior (A) and lateral (B) view, and left wrist fracture in anteroposterior (C) and lateral (D) view.

By 3 months, the patient had regained nearly full functional range—elbow flexion-extension from 10° to 130°, wrist flexion-extension of over 60°. At 12 months, a return to manual labor was imperative, mirroring the favorable recovery described by Bobovec et al. in their 2022 follow-up [5]. Finally, while exceedingly rare, such injury patterns must be recognized and addressed using standardized trauma protocols balanced with tailored surgical and rehabilitative strategies. This case enhances the body of knowledge on complex bilateral upper limb trauma and underscores the potential for excellent functional outcomes with coordinated, evidence-based treatment planning.

Clinical significance

This case offers critical lessons:

- Vigilance for rare combinations: Any trauma patient with bilateral upper limb deformity should undergo full-length imaging.
- Staged fixation is effective: Prioritizing dislocation reduction followed by internal fixation allows



Figure 7: 12-month follow-up clinical image showing elbow flexion of 130° (A), wrist extension of 60° (B), wrist flexion of 60° (C), supination of 80° (D), and pronation of 80° (E).

compartmentalized management.

- Rehabilitation drives outcome: Early and aggressive mobilization post-fixation is crucial in regaining near-complete function.

Conclusion

Bilateral elbow dislocation combined with distal radius fractures is a rare yet serious upper limb injury requiring prompt recognition. A structured treatment plan involving early

dislocation reduction, surgical fixation, and timely rehabilitation can lead to excellent outcomes. High clinical suspicion and comprehensive evaluation are key, especially in high-energy trauma.

Clinical Message

High-energy upper limb trauma can result in atypical bilateral injury patterns. Prompt recognition, early reduction, and surgical stabilization, followed by structured rehabilitation, lead to optimal recovery in complex cases involving bilateral elbow dislocation and distal radius fractures.

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

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