

## Volar Radiocarpal Subluxation an Unusual Complication Following Distal Radius Fracture Fixation with Locking Plate- A Case Report

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### Abstract

**Introduction:** Distal radius fractures are commonly treated by fixation using a volar locking plate. In some fracture patterns this mode of fixation is not adequate. This case report aims to describe one such case.

**Case report:** We report a case of a 28-year-old gentleman who presented with volar subluxation of the radiocarpal joint early in the postoperative period following fixation of the distal end radius volar locking plate.

**Conclusion:** Volar locked plates have become the most common fixation strategy for distal radius fractures. In certain fracture patterns where a volar locking plate would be inappropriate, an alternative fixation strategy should be considered such as rim plate.

**Keywords:** volar locking plate, volar rim plate, radiocarpal dislocation

### Introduction

Distal radius fracture is one of the most common injuries encountered in orthopedic practice. It can result from a trivial injury in the elderly or due to high velocity injuries in younger patients. Multiple treatment options have been described such as closed reduction and cast application, closed reduction and pinning, open reduction and internal fixation with plate and external fixators [1]. In the contemporary setting, open reduction and volar locking plate fixation has become the preferred treatment for most of these fractures. Monoblock volar locking plates are currently the popular choice for treatment. They are useful for extra-articular bending fractures with comminution in younger patients and are also commonly used in elderly patients having fractures with intra-articular extension that are multi-fragmentary [2]. They have a known complication rate of up to 27% [3] and must be placed proximal to the watershed line to avoid undue prominence of the implant volarly which may result in irritation of the flexor tendons [4]. Highly comminuted fractures involving very small and very distal fragments are commonly encountered, in which case, volar locking plates should not be utilized [5]. In these situations, other methods should be used such as stabilization of the radius in a columnar or fragment specific fixation. Here we described a report a case of volar subluxation of distal radiocarpal joint following bartons fracture and fixation with a volar locking plate in the early postoperative period.

### Case report

A 28-year-old gentleman presented to the emergency department following a fall from bike resulting in close bartons fracture of the right forearm without any distal neurovascular deficit. (Figure 1) After preoperative evaluation a plan was made for open reduction and internal fixation with volar locking plate. The immediate post-operative X-ray showed a well reduced bartons fracture without any subluxation. (Figure 2) At the next follow-up after four weeks, the patient was asymptomatic however, X-ray of the right wrist showed volar subluxation of distal radio-ulnar joint. (Figure 3) The patient had no history of trauma in the postoperative period and the arm was supported with a splint. The fracture was revised with Synthes volar rim plate. During revision surgery, fracture was found at the volar rim of the lunate fossa due to which the fracture was reduced and fixed with rim plate. (Figure 4) Post-operative X-ray showed a well reduced fracture and reduced volar subluxation. (Figure 6) (Figure 7)

### Discussion

Volar Barton fractures are relatively uncommon fractures (1.5-10.5%) and typically have unsuccessful outcomes with closed reduction due to obliquity, inadequate carpal support and due to proximal pull by the flexor muscles. Complications are also uncommon. One study found that 84.4% of patients had either excellent or good outcomes with 75% having no complications [6]. Of the complications noted in the literature, irritation of tendons, prominence of hardware and infection are most common [1]. Articular fractures may also be associated with radiocarpal dislocation and they have been classified by Müller et al [7]. Articular fractures which result from a shearing force to the wrist are classified as type B and further subclassified by Jupiter into three subgroups [8]. Barton's fracture or volar marginal articular fracture is classified as B3. Volar dislocations are less common than dorsal dislocations. Open reduction with internal fixation is the treatment method most

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**Figure 1:** Preoperative X-ray of right wrist joint A.P. and lateral view



**Figure 2:** Immediate postoperative X-ray of right wrist joint A.P. and lateral view



**Figure 3:** Post surgery four weeks follow up X-ray of right wrist A.P. and lateral view



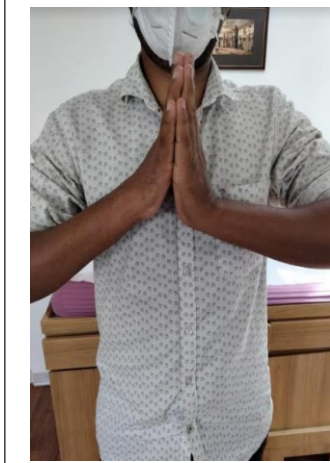
**Figure 4:** Intraoperative picture of right wrist joint



**Figure 5:** X-ray of right wrist A.P. and lateral after revision surgery with rim plate



**Figure 6:** Post surgery six weeks follow up X-ray



**Figure 7:** Dorsiflexion of wrist post-surgery 6 weeks follow up

commonly used for these intra-articular injuries [9]. Our patient had 2R3B3 (AO/OTA) distal radius fracture. Patient presented with closed Barton's fracture of the radius without any distal neurovascular deficit. The immediate post-operative X-ray showed a well reduced fracture without any subluxation. After 4 weeks, the patient was asymptomatic however, X-ray of the right wrist showed volar subluxation of distal radio-ulnar joint. The fracture was revised with Synthes volar rim plate and seen to be well reduced with corrected subluxation on post-operative X-ray. 6 weeks later the patients wrist range of movements returned to normal without any functional lag.

This report brings to attention that when evaluating volar fractures, three-dimensional computed tomography scans may well provide important additional information preoperatively. In this case if a CT scan had been done it may have produced better post-operative outcomes.

For intraarticular fractures of distal end radius below the water shed line, volar rim plate is the implant of choice. Very few cases have been found in the literature reporting this complication. By proper preoperative planning and advanced imaging modalities like computed tomography and with volar rim plate which holds the rim fracture fragment to prevent joint subluxation this complication can be prevented.

**Conclusion**

Volar locked plating has been most common fixation strategy employed for distal radius fractures but there are certain fracture patterns in which volar locking plate is not right choice alternative fixation strategy should be considered. Such as volar rim plate.

**Clinical Message**

In comminuted distal end radius fractures, imaging modalities like C.T. scan are mandatory for proper preoperative planning along with determining the appropriate fixation strategy.

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

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

## References

1. International Journal of Research in Medical Sciences Chavhan AN et al. Int J Res Med Sci. 2017 Feb;5(2): 574-582.
2. Alter, Todd H. and Ilyas, Asif M., "Complications Associated with Volar Locking Plate Fixation of Distal Radial Fractures." (2018). Rothman Institute Faculty Papers. Paper 109. [https://jdc.jefferson.edu/rothman\\_institute/109](https://jdc.jefferson.edu/rothman_institute/109).
3. Wilson J, Viner JJ, Johal KS, Woodruff MJ. Volar Locking Plate Fixations for Displaced Distal Radius Fractures: An Evaluation of Complications and Radiographic Outcomes. Hand (N Y). 2018 Jul;13(4):466-472. doi: 10.1177/1558944717717505. Epub 2017 Jul 9. PMID: 28691543; PMCID: PMC6081777.
4. Rohit Garg, Chaitanya S. Mudgal, When a volar locking plate is not the right choice in fractures of the distal radius: Case based technical considerations, Journal of Clinical Orthopaedics and Trauma, Volume 11, Issue 4, 2020, Pages 542-553, ISSN 09765662, <https://doi.org/10.1016/j.jcot.2020.05.040>. (<https://www.sciencedirect.com/science/article/pii/S0976566220302320>)
5. Alter, Todd H. and Ilyas, Asif M., "Complications Associated with Volar Locking Plate Fixation of Distal Radial Fractures." (2018). Rothman Institute Faculty Papers. Paper 109. [https://jdc.jefferson.edu/rothman\\_institute/109](https://jdc.jefferson.edu/rothman_institute/109).
6. Harikrishnan Balakrishna Pillai, Suraj Sankar, Surendra Singh Rawat, Samarth Arya, Pradeep Jadhav. The functional outcome volar Barton fracture treated by open reduction and internal fixation with T plate – a prospective study. International Journal of Contemporary Medical Research 2020;7(6):F7-F11.
7. Müller ME, Koch P, Nazarian S, Schatzker J. Principles of the Classification of Fractures. In: Müller ME, Koch P, Nazarian S, Schatzker J, editors. The Comprehensive Classification of Fractures of Long Bones. Berlin, Heidelberg: Springer; 1990. p. 4–7.
8. Jupiter, Jesse B. MD Complex Articular Fractures of the Distal Radius: Classification and Management, Journal of the American Academy of Orthopaedic Surgeons: May 1997 - Volume 5 - Issue 3 - p 119-129.
9. Ilyas, Asif M. MD; Mudgal, Chaitanya S. MD Radiocarpal Fracture-dislocations, Journal of the American Academy of Orthopaedic Surgeons: November 2008 - Volume 16 - Issue 11 - p 647-655.

Abbreviations: C.T.- Computed Tomography, AO/OTA: Arbeitsgemeinschaft für Osteosynthesefragen/ Orthopaedic Trauma Association

### How to Cite this Article

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