

Abstract

Clinical scenario: Distal radius fractures are a common injury throughout the lifespan. As healthcare professionals, knowing the best interventions for a wide range of ages is crucial information. Common interventions can include external fixation, volar plating, internal fixation and casting. **Focused clinical question:** In patients with distal radius fractures, does volar plating or external fixation surgery lead to better restoration of range of motion? **Search strategy:** When researching distal radius fractures, inclusion criteria were volar plating, external fixation, radial fracture and range of motion (ROM). The exclusion criteria were bilateral fractures, fractures including the ulna, and closed reduction. Over 14,000 studies searched and 9 of them were reviewed based on the inclusion criteria. The studies reviewed were found on PubMed, CINAHL, ProQuest Nursing Collection, and Cochrane Library. **Evidence quality assessment:** The PEDro scores for the studies ranged from 5/10-9/10. Oxford 2011 Levels of Evidence scores were 2 for all studies. **Results and summary of search:** Both interventions were consistent with increasing ROM throughout the studies. Large sample sizes in the studies were considered strengths and weakness. The large amount of patients gave some of the studies a better understanding of the better intervention. On the other hand, low sample sizes caused the results. **Clinical bottom line:** Throughout the studies, patients with the volar plating surgery ended with larger ROM numbers, compared to external fixation. Patients with volar plating surgery did start with lower ROM numbers but finished with higher ROM ranges after 6-months post-surgery. Each intervention were comparable by the end of each study and both could be considered effective techniques. The SORT score for the studies was a B. **Implications:** With the review of these studies both are still acceptable outcomes when it comes to ROM, but volar plating showed to be more consistent with higher ROM degrees. A patient who is looking to decrease the amount of time away from activity should consider a volar pate. **Word count:** 329 words.

Clinical Scenario

- Distal radius fractures are commonly found in the aging population and participants in outdoor activities.⁴
- Surgical restoration of the distal radius can preserve the joint mobility and ensure the best functional outcome¹
- Hands are extremely common body parts used during daily activities and need proper ROM to perform them.
- ROM was measured using a goniometer and was measured in degrees or compared to the unaffected side.^{2,3,5,6,7,8,9}

Focused Clinical Question

In patients with distal radius fractures, does volar plating or external fixation surgery lead to better restoration of range of motion?

Search Strategy

Inclusion Criteria

- Volar plating
- External fixation
- Radial fractures
- Range of Motion (ROM)
- Studies after 2001

Exclusion Criteria

- Bilateral fractures
- Fractures including the ulna
- Closed reduction
- Studies before 2001

Databases Used

- PubMed
- CINAHL
- ProQuest Nursing Collection
- Cochrane Library

Included Search Terms

- Radius fractures
- Volar plating
- External fixation
- Range of Motion (ROM)

Evidence Quality Assessment



Figure 1. Picture of a non-bridging external fixator 1-week after surgery

- PEDro scores ranged from 5/10 to 9/10
- Oxford 2011 Level of Evidence score were 2 for all studies



Figure 2. Picture of a distal radius fracture 1-year after volar plating fixation

Results and Summary of Search

Table 1. Final ROM results of patients for Volar Plating versus External Fixation

Study	Surgery Type	Flexion (°)	Extension (°)	Pronation (°)	Supination (°)	Radial Deviation (°)	Ulnar Deviation (°)
Wright TW ²	Volar Plating	64	69	78	76	23	34
	External Fixation	59	63	73	72	21	31
Rizzo M ⁶	Volar Plating	64	69	78	76	23	34
	External Fixation	59	63	73	72	21	31
Richard MJ ⁷	Volar Plating	69	69	85	83	N/A	N/A
	External Fixation	54	58	74	68	N/A	N/A
Wei DH ⁹	Volar Plating	53	63	89	81	13	28
	External Fixation	66	63	68	68	14	33

Table 1. Final ROM results of patients for Volar Plating versus External Fixation. Studies that measured the ROM in degrees for each wrist action. (° = degrees of range of motion, N/A = not available)

Table 2. Final results in mean percentage of the uninjured side for Volar Plating versus External Fixation

Study	Surgery Type	Flexion(°)	Extension (°)	Pronation (°)	Supination (°)	Radial Deviation (°)	Ulnar Deviation (°)
Kumbaraci, M ⁵	Volar Plating	64.7*	58.8	80.6*	82.3	21.3	32.3
	External Fixation	60.7	57.8	76.4	80.1	20.6	31.8
Egol K ⁵	Volar Plating	82	87	100*	95	96	78
	External Fixation	84	90	95	99	99	79
Gradl G ⁸	Volar Plating	92.2	86.6	100	99	93.9	92.3
	External Fixation	94.5	91.1	100	98.5	97.6	93.1

Table 2. Final results in mean percentage of the uninjured side for Volar Plating versus External Fixation. These studies used mean in percentage to compare the affected side to the unaffected side. (*= p-value is <0.05 which shows statistical significance)

Clinical Bottom Line

- Volar plating consistently had a better restoration of ROM in patients at the 12 month checking period.
- Prior to the 12 month checking period, patients experienced faster increase in the restoration of ROM in external fixation, compared to volar plating.
- The level of recommendation according to the Strength of Recommendation Taxonomy (SORT) is considered a B.

Implications

- Both volar plating and external fixation can be considered acceptable outcomes, due to the fact they both show similar improvements in restoring normal ROM function.
- With greater restoration of ROM for long term, volar plating would be the better option for return to activity.
- An athletic trainer should consider both options but look at the effect on long term restoration of ROM, because of the amount of time using hands/wrists during activity.

References

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