

SPRING WIRE TECHNIQUE FOR STABILIZATION OF VOLAR RIM FRAGMENT IN COMPLEX DISTAL RADIUS FRACTURES

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INTRODUCTION

The volar rim fragment, also known as The Critical Fragment, has gained considerable attention lately because it's importance for wrist stability and preventing volar carpal subluxation.

The wrist's stability is threatened by the lunate facet; because it bears half of the total force transmitted across the wrist joint in extension and ulnar deviation. Also, it accounts for 46 percent of contact area across the radiocarpal joint.

AIM OF THE WORK

The aim of this work was to evaluate the results of stabilizing volar rim fragment using spring wire and volar plate technique in management of complex distal radius fractures.

PATIENTS AND METHODS

The study included twenty patients presented to El-Hadara University Hospital with complex distal radius fractures and small volar rim fragment. Those were treated by open reduction and internal fixation with spring wire and volar plate technique.

Inclusion criteria:

- Patients aged from 18 to 50 years.
- Complex distal radius fractures with small volar rim fragment on X-ray and confirmed on CT.

Exclusion criteria:

- Open fractures.
- Osteoporotic fractures.

According to the size of the volar rim fragment, one or two thin K-wires (0.8 or 1 mm) are inserted into the distal volar lip, directed to the opposite uninjured proximal dorsal cortex. The spring wire effect is created by gently bending the K-wires over the volar lip of the radius after the volar rim fragment has been reduced. The spring wire is subsequently captured and stabilized by the volar plate, which is then fitted and secured onto the radial shaft.

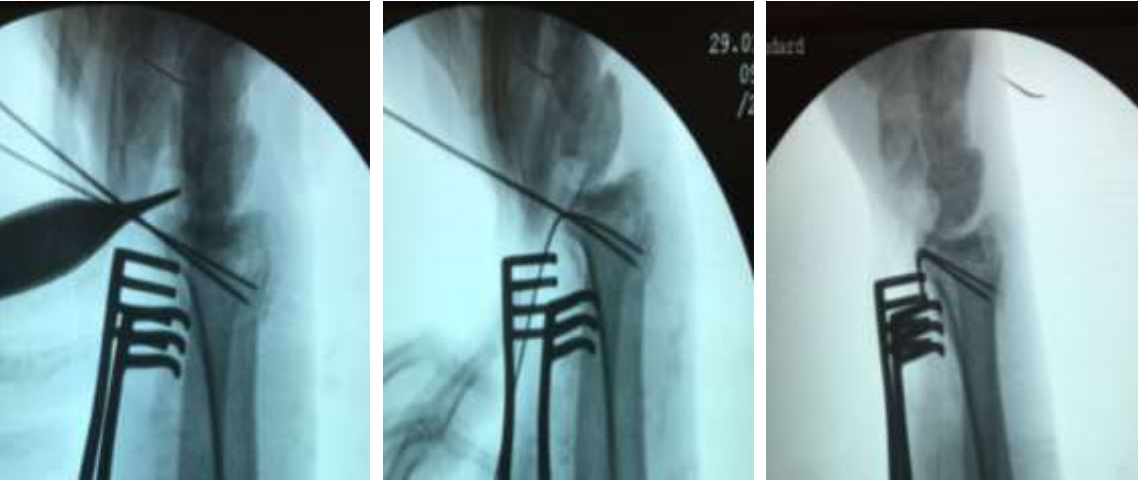


Figure: Intraoperative fluoroscopy showing sequence of K-wire fixation with spring wire technique.

RESULTS

All cases in this study showed a well reduced and healed volar rim fragment on final radiographs. There were no complications and all patients achieved functional range of motion and grip strength. Volar carpal subluxation did not occur in any of the patients. Removal of hardware was not needed in any of the patients.



Figure: x-ray after 6 months follow up.

Table: Patients results shown according to PRWE score.

Age/Gender	Hand/Dominant	PRWE score
34 M	Right/RHD	2
29 M	Left/RHD	2.5
27 M	Left/RHD	16
50 M	Left/RHD	10
50 M	Left/RHD	15.5
30 M	Left/LHD	31
43 M	Left/RHD	14
49 F	Right/RHD	12
44 M	Left/RHD	40
50 F	Left/RHD	9
27 M	Left/RHD	44
39 M	Left/RHD	2.5
27 M	Right/RHD	4
37 M	Right/RHD	17
33 M	Left/RHD	16.5
43 M	Left/RHD	3.5
50 M	Right/RHD	9.5
38 F	Right/RHD	13
50 F	Left/RHD	2
26 M	Left/RHD	1

CONCLUSION

- Spring wire technique is a useful method of fixation in cases of small volar rim fragment that can't be held securely by volar plating alone.
- Spring wire technique has the advantage of low profile implant that is readily available, inexpensive and easily used by most surgeons.
- The volar rim fragment is stabilized by dual mechanism of both the spring wire effect and the volar plate that act as a buttress to volar displacement.
- The use of small K wires avoids disruption of the critical volar carpal ligaments.