Radiographic and Clinical Outcomes of Distal Radius Fractures Treated with Volar Locking Plates versus Fragment-Specific Fixation

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Background

- Distal radius are common injuries and trend towards surgical fixation continues to increase
- Advancements in orthopedic implants have resulted in a variety of plating options, including plates designed for specific fractures fragments
- Indications for these constructs over conventional volar locking plates remains largely subjective
- Majority of existing comparison studies are biomechanical or cadaveric, and exhibit mixed results

Methods

- Retrospective institutional database review performed
- Inclusion criteria
  - Skeletally mature
  - Treated with ORIF (VLP, FSF)
  - >6 months follow-up data
- Exclusion criteria
  - Skeletally immature
  - Concomitant ex-fix or DSP
  - <6 months follow-up data
  - Preexisting wrist deformity
- Radiographic and clinical data extracted
- Analyses performed using paired t-test, Mann-Whitney U test, chi-square test

Results

- 54 patients were included – 26 VLP, 28 FSF
- FSF groups had more complex, intra-articular fractures

Selected Patient Demographics	VLP	FSF	*p*
Mean age, y	56.8	48.6	0.982
Sex, n (%)			0.161
Male	9 (34.6)	15 (53.6)	
Female	17 (65.4)	13 (46.4)	
Side involvement, n (%)			0.571
Dominant	11 (42.3)	13 (46.4)	
Nondominant	15 (57.7)	15 (53.6)	
Fracture pattern, n (%)			0.016
A	7 (26.9)	1 (3.6)	
B	3 (11.5)	10 (35.7)	
C	16 (61.5)	17 (60.1)	

- Largely no radiographic differences observed in any fracture pattern at any time point

Fracture type A	VLP (n=7)	FSF (n=1)	*p*
Radial height (mm)			
Post-op	12.1	14.0	0.174
Final follow-up	11.1	15.0	0.118
Radial inclination (deg)			
Post-op	19.9	29.4	0.127
Final follow-up	22.4	29.8	0.127
Volar tilt (deg)			
Post-op	6.6	9.9	0.513
Final follow-up	7.8	4.6	0.513

Fracture type B	VLP (n=3)	FSF (n=10)	*p*
Radial height (mm)			
Post-op	12.7	13.1	0.599
Final follow-up	12.3	12.8	0.666
Radial inclination (deg)			
Post-op	21.9	24.2	0.237
Final follow-up	26.2	25.3	0.446
Volar tilt (deg)			
Post-op	14.1	-0.8	0.043
Final follow-up	15.8	6.6	0.128

Fracture type C	VLP (n=16)	FSF (n=17)	*p*
Radial height (mm)			
Post-op	12.0	12.4	0.986
Final follow-up	11.1	11.6	0.927
Radial inclination (deg)			
Post-op	22.9	22.1	0.652
Final follow-up	22.7	22.6	0.349
Volar tilt (deg)			
Post-op	4.5	4.6	0.914
Final follow-up	5.7	6.1	0.773

- There were more complications and reoperations in the FSF group vs VLP group

Complications and Reoperations	VLP	FSF	*p*
Total complications, n	6	14	0.041
Tendinopathy	1	6	
Persistent pain	1	4	
Paresthesia	3	3	
Screw perforation	1	0	
Malunion	0	1	
Total reoperations, n	1	9	0.025
Removal of hardware	1	7	
Tenolysis	0	1	
Neurolysis	0	1	

Conclusions

- No difference in ability of VLP or FSF to restore and maintain radiographic parameters.
- Even with increasing fracture complexity, FSF can restore and maintain reduction.
- FSF significantly higher risk of complications, reoperations.

Limitations

- Retrospective nature
- Relatively small sample size
- Heterogenous distribution of fracture patterns
- Mean follow-up < 1 year

Future Studies

- Prospective RCT
- Analysis of functional outcomes (in progress)
- Cost-analysis

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