



Dorsal or Volar? CT Evaluation of Distal Oblique Scaphoid Fractures Treated with Percutaneous Screw Fixation

Daniel Lorenzana MD MS¹, Christopher Klifto MD¹, Robert French, MD², Tyler Pidgeon MD¹, Marc Richard MD¹, David Ruch MD¹

¹Department of Orthopaedic Surgery, ²Department of Radiology, Duke University Medical Center, Durham, North Carolina



Background and Hypothesis

Both volar and dorsal percutaneous approaches are described for screw fixation of distal oblique (B1) scaphoid fractures (Figure 1). This study hypothesized that dorsal screw fixation of B1 fractures is associated with:

1. a more anatomic reduction and
2. a screw trajectory that is closer to perpendicular relative to volar screw fixation.

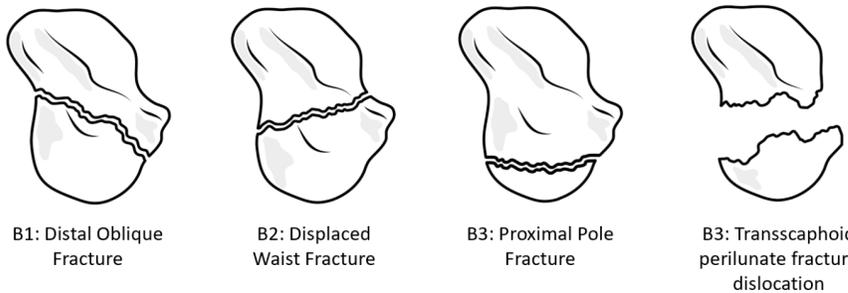


Figure 1: Subclassification of acute, unstable scaphoid fractures (Type B). Adapted from Herbert and Fisher 1984.

Methods

- Retrospective review of all percutaneous screw fixation of acute B1 scaphoid fractures between 2009 and 2019
- Distal oblique (B1) fractures were defined as an oblique fracture from proximal to the dorsal ridge exiting in the distal volar third.
- Post op CT were reviewed for height-to-length (HL) ratio, intrascaphoid angle (ISA), dorsal cortical angle (DCA), fracture obliquity relative to scaphoid axis, screw obliquity relative to the fracture, and fracture gap (if applicable). Patient demographics and clinical outcomes were also documented, including wrist range of motion and visual analogue scale score at final follow up.

- 20 B1 scaphoid fractures treated by percutaneous screw fixation with postoperative CT (9 volar, 11 dorsal)
- Mean height-to-length ratio of the dorsal group was significantly less than the volar group (0.64 vs 0.71, p=0.02)
- Mean intrascaphoid angle was lower and dorsal cortical angle was higher in dorsally reduced fractures but these did not reach significance.
- Screw trajectory for the dorsal group was slightly closer to perpendicular but this did not reach significance (53.6 vs 49.9 deg, p=0.29)
- There were no significant differences between group demographics, range of motion or visual analog scale score at final follow up.

	All (n=20)	Volar (n=9)	Dorsal (n=11)	p value
Sex (%)	19 males (95%)	8 males (88.9%)	11 males (100%)	0.45
Age	25.91 (11.18)	24.21 (7.60)	27.30 (13.65)	0.55
Dominant injured (%)	7 (35%)	4 (44.4%)	3 (27.2%)	0.64
Active smoker (%)	0 (0%)	0 (0%)	0 (0%)	>0.99
DM (%)	0 (0%)	0 (0%)	0 (0%)	>0.99
Return to full activity (months)	3.20 (1.11)	3.09 (0.94)	3.29 (1.26)	0.70
Follow up (months)	6.82 (6.78)	5.59 (5.77)	7.82 (7.63)	0.48
Flexion (deg)	63.3 (12.6)	64.2 (12.4)	62.8 (13.5)	0.84
Extension (deg)	63.3 (12.1)	62.5 (12.9)	63.9 (12.4)	0.84
VAS	0.18 (0.38)	0.00 (0.00)	0.32 (0.46)	0.07
Delay to surgery (weeks)	2.48 (2.47)	2.20 (2.59)	2.70 (2.50)	0.31
Height/Length ratio	0.67 (0.07)	0.71 (0.07)	0.64 (0.05)	0.02
Dorsal Cortical Angle (deg)	96.72 (14.60)	92.68 (16.37)	100.03 (12.80)	0.27
Intrascaphoid angle (deg)	38.56 (10.43)	41.43 (10.51)	36.20 (10.23)	0.28
Fracture obliquity (deg)	59.67 (4.42)	59.92 (4.73)	59.45 (4.37)	0.82
Screw obliquity (deg)	51.87 (7.43)	49.93 (6.20)	53.62 (8.33)	0.29

A dorsal approach may allow better reduction in percutaneous screw fixation of distal oblique scaphoid fractures.

Conclusions

- A dorsal approach was associated with a greater height-to-length ratio on postoperative CT, which suggests a more anatomic reduction.
- Both volar and dorsal approaches otherwise had equivalent outcomes and can be successfully used for the management of B1 scaphoid fractures.
- There were no significant differences in final wrist range of motion or visual analogue scale score between these groups.

Source of Funding

There was no outside sources of funding used for this study or in the preparation of the abstract/poster/manuscript.