

Initial Varus Displacement of Proximal Humerus Fractures Results in Similar Function But Higher Complication Rates

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Purpose: This review was conducted to investigate the effect of initial varus or valgus surgical neck alignment on outcomes of patients who sustained proximal humerus fractures treated with open reduction and internal fixation (ORIF).

Methods: An IRB-approved database of proximal humerus fractures treated with locked plates was reviewed. Of 185 fractures in the database, 101 fractures were identified and met inclusion criteria. Initial varus displacement was seen in 47 fractures (OTA types 11.A2.2, A3.1, A3.3, B1.2, B2.2, C1.2, C2.2, or C2.3) and initial valgus displacement was observed in 54 fractures (OTA types 11.A2.3, B1.1, C1.1, or C2.1). All patients were treated in a similar manner and examined by the treating physician at standard intervals. Functional outcomes were quantified via the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire and physical examination data at 12 months. Radiographs were reviewed for complications of healing. Additionally, complication rate and reoperation rate were investigated.

Results: At a minimum 12 months follow-up, there was no statistically significant difference in DASH scores between those presenting with varus versus valgus fracture patterns. In addition, no statistically significant differences were seen in final shoulder range of motion in any plane (Table 1).

Table 1. Functional Outcome Measurements and Results*

	DASH Survey (<i>P</i> = 0.09)	Active Forward Elevation (<i>P</i> = 0.68)	External Rotation (<i>P</i> =0.06)
Varus	29.0 (±22.1)	130.7 (±34.3)	40.3 (±18.2)
Valgus	21.8 (±23.0)	134.0 (±32.7)	47.3 (±17.2)

*Significance was assessed via the Mann-Whitney *U* test. Values are expressed as mean ± standard deviation.

Overall, 30 patients included in this study developed a complication. A significantly greater number of patients in the initial varus cohort developed complications (40.4%), as compared to 20.3% of patients in the initial valgus cohort (*P* = 0.03). Differences between the groups for specific complications (Table 2) could not be determined due to inadequate power.

• The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an “off label” use). For full information, refer to page 600.

POSTER ABSTRACTS

Table 2. Complication Breakdown*

	Screw Penetration	ON	Malunion	HO	ROM/Pain (interferes with ADL at 12 mo.)	Infection	Varus angulation	Other
Varus	7 (14.9%)	4 (8.5%)	2 (4.3%)	0 (0%)	4 (8.5%)	2 (4.3%)	3 (6.4%)	4 (8.5%)
Valgus	4 (7.4%)	2 (3.7%)	3 (5.6%)	4 (7.4%)	2 (3.7%)	2 (3.7%)	0 (0.0%)	1 (1.9%)

*Values are expressed as number and percent within respective cohort. Other complications include osteoarthritis, hardware failure, adhesive capsulitis of shoulder, and shoulder pseudosubluxation. ON = osteonecrosis, HO = heterotopic ossification, ROM = range of motion

Of the 14 patients in this study who underwent reoperation, 9 of them (64.3%) had an initial varus displacement, while 5 (35.7%) had an initial valgus displacement ($P = 0.15$).

Conclusion: In this study, initial surgical neck displacement in varus or valgus was found to not significantly affect functional outcome. However, patients with varus displaced proximal humerus fractures may be at a greater risk of developing postoperative complications than those who present with initial valgus displaced fracture patterns.