Revisiting the Fixation of Valgus-Impacted Femoral Neck Fractures

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Purpose: Our objective was to report clinical outcomes following internal fixation of valgus-impacted femoral neck fractures using a new fixed-angle sliding device.

Methods: This was a multicenter retrospective review of patients with valgus-impacted femoral neck fractures treated using the Synthes Femoral Neck System (FNS) with minimum 3-month follow-up. Primary outcome was reoperation rate. Secondary outcomes included fixation failure, infection, nonunion, and mortality rates at 3 and 6 months.

Results: 114 patients met inclusion criteria, with an average age of 72.1 years (Interquartile range [IQR] 68-83). Fracture classifications included 114 valgus-impacted fractures with <20° of posterior tilt ("stable"), and 7 valgus-impacted fractures with >20° of posterior tilt ("posterolateral"). All posterolateral fractures underwent a reduction maneuver. Overall reoperation rate was 7.9%, with no patients in the posterolateral group requiring reoperation. Reasons for reoperation included 5 conversion arthroplasties for osteonecrosis (4.7%), 2 nonunions (1.8%), 1 peri-implant fracture (0.9%), and 1 hardware removal (0.9%). There were no cases of acute fixation failure. Mortality rate was 0.9% at 3 months and 2.2% at 6 months.

Conclusion: In this multi-institutional case series, surgical fixation with a new fixed-angle sliding device was associated with low rates of fixation failure and nonunion in stable and posterolateral femoral neck fractures. This suggests that this implant is at least comparable to other devices in the literature for the valgus-impacted injury pattern. This study also found a 0% reoperation rate in the pseudo-stable, posterolateral subgroup, all of whom underwent some kind of reduction prior to fixation. Future studies are warranted to determine if this could be viable approach for this specific fracture pattern, sparing patients the need for an index arthroplasty procedure.

Table 1: Demographics, Fracture Characteristics and Complications

	Stable n = 107	Posterolateral n = 7	All n = 114	P
Reoperations				
Any	9 (8.4%)	0 (0%)	9 (7.9%)	>0.999
Before 3 mo	1 (0.9%)	0 (0%)	1 (0.9%)	>0.999
-Infection	1 (0.9%)	0 (0%)	1 (0.9%)	
After 3 mo	8 (7.6%)	0 (0%)	8 (7.0%)	>0.999
-Arthroplasty (AVN)	5 (4.7%)	0 (0%)	5 (4.4%)	
-Arthroplasty (nonunion)	2 (1.9%)	0 (0%)	2 (1.8%)	
-Hardware Removal	1 (0.9%)	0 (0%)	1 (0.9%)	
-Peri-implant Fracture	1 (0.9%)	0 (0%)	1 (0.9%)	
Complications				
Fixation Failure	0 (0%)	0 (0%)	0 (0%)	>0.999
Nonunion	2 (1.9%)	0 (0%)	2 (1.8%)	>0.999
AVN	8 (7.5%)	0 (0%)	8 (7.0%)	>0.999
Infection	1 (0.9%)	0 (0%)	1 (0.9%)	>0.999
Superficial	0 (0%)	0 (0%)	0 (0%)	>0.999
Deep	1 (0.9%)	0 (0%)	1 (0.9%)	>0.999
Mortality w/in 3 mo	1 (0.9%)	0 (0%)	1 (0.9%)	>0.999
Mortality between 3 and 6 mo (6 mo mortality rate)	0 (1.0%*)	1 (17%*)	1 (2.2%*)	0.0614
Demographics:				
Age (years)	72.9 (IQR 69-83)	60.7 (IQR 32-80)	72.1 (68-83)	0.1324
Male	30 (28%)	3 (43%)	33 (29%)	0.4109
BMI	24.6 (IQR 20.9-26.5)	26.2 (IQR 20.5-25.2)	24.6 (IQR 20.9-26.4)	0.5119
Diabetes	19 (18%)	1 (14%)	20 (18%)	>0.999
Hypothyroidism	24 (22%)	1 (14%)	25 (22%)	>0.999
Smoking (active)	19 (18%)	2 (29%)	21 (18%)	0.6110
Preop Independent WB	65 (61%)	4 (57%)	69 (61%)	0.5955
Follow-Up (weeks)	51.3 (IQR 20-73)	34.6 (IQR 12-56)	50.0 (IQR 20-69)	0.1493
Reduction				**0.0089**
Direct	4 (3.7%)	2 (29%)	6 (5%)	
Closed	55 (51%)	5 (71%)	60 (53%)	
No reduction	48 (45%)	0 (0%)	48 (42%)	
Plate Length				0.0761
1 hole	101 (94%)	5 (71%)	106 (93%)	
2 hole	6 (5.6%)	2 (29%)	8 (7%)	

*6 month mortality rate based on the number of patients who had 6 month follow-up (91 patients overall: 85 stable, 6 posterolateral).