

Cephalomedullary Nail Fixation of Intertrochanteric Fractures: Are Two Proximal Screws Better than One?

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Purpose: This study was conducted to analyze radiographic changes in intertrochanteric fracture alignment after treatment with either a one or a two (integrated)-screw cephalomedullary nail construct.

Methods: 1004 OTA 31-A, 31-B2.1 fractures (1002 patients) treated with either a single-screw cephalomedullary nail (Gamma 3, Stryker), or a two integrated screw cephalomedullary nail (InterTAN, Smith & Nephew) between February 1, 2005 and June 30, 2013 were identified at our institution and reviewed retrospectively. Patients younger than 50 years, follow-up (f/u) less than 3 months, a tip-apex distance >25 mm, inaccurate lag screw placement, pathologic fractures, and revisions were excluded. Fracture stability was based on the Evans classification. Radiographic review included: fracture pattern (stable vs. unstable), postoperative (postop) fracture reduction, differences in the neck shaft angle (NSA), and femoral neck shortening (FNS) at 3, 6, and 12 months postop. Measurements of implant size, NSA, and FNS were normalized using known lag screw dimensions that were digitally corrected for magnification. Rotational discrepancies between radiographs were controlled using a ratio of known to measured dimensions. NSA and FNS were compared at each time interval for all fractures, to measure changes occurring with each device. The Mann-Whitney *U* test was used for statistical analysis.

Results: 372 patients died and 219 were lost to f/u, leaving 413 patients (413 fractures) with more than 3 months f/u. Mean age was 76 years (range, 51-103 years). 67% were female. Of 413 fractures, 130 were treated with a single-screw device (79 stable, 51 unstable), and 283 with a two integrated screw device (155 stable, 128 unstable). At 6-month f/u, there were 64 fractures treated with the single-screw device (33 stable, 31 unstable) and 107 with the two integrated screw device (51 stable, 56 unstable). At 12-month f/u there were 54 fractures treated with the single-screw device (32 stable, 22 unstable) and 54 with the two integrated screw device (23 stable, 31 unstable). Table 1 illustrates the changes between postop and the 12-months f/u films.

Table 1	NSA Changes at 12-Month f/u (degrees)		Shortening (FNS) at 12-Month f/u (mm)	
	Single	Two Integrated	Single	Two Integrated
All Fractures	4.56	1.81*	5.10 (0-13.36)	2.36 (0-7.84)*
Stable	4.19	1.24*	4.91 (0-11.62)	2.35 (0-6.50)*
Unstable	5.08	2.24*	5.37 (0-13.36)	2.38 (0-7.84)*

*Differences statistically significant (*P* < 0.001)

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The single-screw device resulted in 2.5 times greater varus collapse (NSA) and 2 times more femoral neck shortening over 1 year than the two integrated screw device, regardless of fracture stability ($P < 0.001$). NSA and FNS changes were greater for both devices in an unstable fracture pattern as compared to stable fractures, but significantly less movement occurred with the two integrated screw device.

Conclusion: A cephalomedullary nail with two integrated proximal screws appears to maintain initial fracture reduction and subsequent position over time (FNS), with less varus collapse (NSA) than a cephalomedullary nail with a single proximal screw. This was true for both stable and unstable fractures. These data indicate that the two integrated screw device resulted in fewer intertrochanteric malunions, which may be clinically important when considering long-term functional outcomes in patients with these fractures.