

## Short vs Long Cephalomedullary Nails for Fixation of Stable vs. Unstable Intertrochanteric Femur Fractures at a Level 1 Trauma Center

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**Objectives:** To compare failure and complications associated with short cephalomedullary nail (SCMN) versus long cephalomedullary nail (LCMN) fixation for stable vs. unstable intertrochanteric femur fractures at a level 1 trauma center.

**Design:** Retrospective Cohort Study. Setting: Academic Level 1 Trauma Center. Patients/ Participants: 201 adult patients with non-pathologic intertrochanteric femur fracture without subtrochanteric extension (OTA 31-A1.1-3, 31-A2.1-3, 31-A3.1-3) that were treated with a SCMN (n=70) or LCMN (n=131) between 2000-2012 and had at least 6 months follow-up. Intervention: ORIF of intertrochanteric femur fracture with either an SCMN or LCMN. Main Outcome Measurements: Treatment failure rate, defined as cutout, non-union, fracture, collapse of more than two centimeters on follow-up radiographs, or revision surgery, not including removal of symptomatic hardware.

**Results:** In the stable fracture group (N=81), there was no difference in failure between SCMNs and LCMNs (p=0.35). In this group, there were three failures with SCMNs (2 cut-outs, 1 collapse) and one failure with LCMN (1 cut-out). In the unstable fracture group (N=120), there was no difference in failure between SCMN vs LCMNs (p=0.47). In this group, there were four total SCMN failures (12.9%) (1 cut-out, 2 non-unions, 1 collapse), and seven LCMN failures (7.9%) (2 cutouts, 3 non-unions, 2 collapse). There were no periprosthetic fractures in the either group.

Table 1. Failures, Complications, and Mortality in Unstable Fracture Patterns (OTA class 31-A2.1-3.3)

	Short Nail (N=44)	Long Nail (N=146)	P value	Adjusted P value	Odds/Hazard ratio (Long vs. Short)
<b>Failure</b>	7 (15.9%)	9 (6.2%)	0.0413 <sup>c</sup>	0.018 <sup>log</sup>	0.26 (0.08 ~ 0.79) <sup>OR</sup>
- Cut-out	2	1	--	--	--
- Non-union	3	3	--	--	--
- Fracture	0	0	--	--	--
- Collapse	0	2	--	--	--
- Revision Surgery	2	3	--	--	--
<b>Complications</b>	14 (31.8%)	39 (26.7%)	0.508 <sup>c</sup>	0.282 <sup>log</sup>	0.65 (0.3 ~ 1.42) <sup>OR</sup>
<b>Mortality</b>	20 (45.5%)	41 (28.1%)	0.03 <sup>s</sup>	0.04 <sup>ph</sup>	0.68 (0.47 ~ 0.99) <sup>HR</sup>
<b>1 year mortality</b>	9 (24.5%)	19 (13%)	0.22 <sup>c</sup>	0.96 <sup>log</sup>	1.04 (0.3 ~ 3.54) <sup>OR</sup>
<b>30 day mortality</b>	3 (6.8%)	6 (4.1%)	0.43 <sup>f</sup>	0.61 <sup>logf</sup>	0.67 (0.15 ~ 3.1) <sup>OR</sup>

<sup>c</sup> Chi-square test, <sup>f</sup> Fisher's exact test <sup>log</sup> Logistic regression adjusting for sex, age, lezzoni comorbidities, days since surgery (evaluated on 12/1/2013), and tip apex distance. <sup>s</sup> Log-rank test comparing survivor functions, <sup>logf</sup> Firth logistic regression adjusting for sex, age, lezzoni comorbidities, days since surgery (evaluated on 12/1/2013), and tip apex distance. <sup>ph</sup> Cox proportional hazard model comparing survivor functions adjusting for sex, age, lezzoni comorbidities, days since surgery, and tip apex distance. <sup>OR</sup>: Odds ratio, <sup>HR</sup>: Hazard ratio

The FDA has stated that it is the responsibility of the physician to determine the FDA clearance status of each drug or medical device he or she wishes to use in clinical practice.

**Conclusions:** SCMNs and LCMNs exhibit similar failure rates in both stable and unstable intertrochanteric femur fractures.