

## **Integrated Dual Lag Screw Cephalomedullary Nails Are Associated with Higher Complication Rates versus Single Lag Screw Cephalomedullary Nails for Intertrochanteric Femur Fractures**

*Christian A. Gonzalez, BS; Noelle L. Van Rysselberghe, MD; Mathew James Whittaker, MD; John B. Michaud, BA; Harin Parikh, MD; Juntian Wang, MD; Abrianna Robles, BS; Andrea Horne, CCRP; Garrett Cavanaugh, MD; Garrett W. Esper, BA; Arya Amirhekmat, BS; Eleni Berhaneselase, BA; Natalie Marie Marengi, MD; Daniel Ngo, BA; Marisa McDow, BS; Christopher G. Herbosa, BS; Maricela Diaz, MA; Uchechukwu Emili, MD; Zachary Lim, MD; Dmitry Pokhvashchev, MD, PhD; Aden Malik, MD; Edmond F. O'Donnell, MD, PhD; Muhammad Umar Jawad, MD; Sean T. Campbell, MD; Milton TM Little, MD; Walt W. Virkus, MD; Philipp Leucht, MD; Matthew R. Garner, MD; Mark A. Lee, MD; John A. Scolaro, MD, MA; Marschall Berkes, MD; Saam Morshed, MD, PhD, MPH; Stephen J. Warner, MD, PhD; Paul William Perdue, MD; Eben Carroll, MD; Justin Lucas, MD; Julius Bishop, MD; L. Henry H. Goodnough, MD, PhD; Michael J. Gardner, MD*

**Purpose:** Systematic reviews and meta-analyses comparing the treatment of intertrochanteric (IT) fractures with integrated dual lag screws (IDL) or single lag (SL) component cephalomedullary nails (CMNs) have reported mixed results in terms of reoperation risk. The purpose of this study was to analyze a large cohort of patients to assess reoperation rates between patients treated with IDL or SL CMNs for IT femur fractures. We hypothesized that there would be no difference in reoperation rates between the groups.

**Methods:** Adults who sustained IT fractures (AO/OTA 31A1-A3) between January 2014 and May 2021 at 13 Level I trauma centers across the US treated with SL or IDL CMNs with a minimum of 3 months follow-up were included. Exclusion criteria included non-IT fractures and pathologic fractures. Initial differences in outcomes were analyzed with a chi-squared test. Multivariable regression that controlled for age, sex, mechanism, fracture pattern, and reduction quality was used to compare outcomes.

**Results:** 2132 patients met inclusion criteria. Head segment fixation included 289 (13.6%) IDL CMNs and 1843 (86.4%) SL CMNs. In total, 101 patients (4.7%) underwent a reoperation, most commonly for fixation failure (28.7% of all reoperations). Patients with IDL CMNs had significantly higher rates (7.6% vs 4.3%,  $P = 0.013$ ) and odds (odds ratio [OR] 1.83 [95% confidence interval (CI) 1.11-3.01],  $P = 0.018$ ) of reoperation as well as significantly higher rates (4.2% vs 0.9%,  $P < 0.001$ ) and odds (OR 4.79 [95% CI 2.22-10.31],  $P < 0.001$ ) of reoperation for fixation failure compared to patients with SL CMNs.

**Conclusion:** In this study, intertrochanteric fractures treated with SL CMNs were associated with significantly lower rates of reoperation compared to IDL CMNs. After controlling for age, sex, mechanism, fracture pattern, and reduction quality, IDL CMNs were found to be significantly associated with nearly twice the odds of reoperation and 5 times the odds of reoperation for fixation failure compared to SL CMNs. Future studies are warranted to confirm these results and to evaluate specific modes of failure between IDL and SL CMNs.