**Helical Blade Versus Lag Screw Fixation for Cephalomedullary Nailing of Low-Energy Pertrochanteric Femur Fractures: Is There a Difference in Cutout?**

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**Background/Purpose:** The helical blade was designed to remove less bone from the femoral head with the intention of providing stronger fixation and resistance to cutout in the femoral head. This study measured the rate of cutout of helical blades and lag screws in low-energy pertrochanteric femur fractures treated with cephalomedullary nailing.

**Methods:** A retrospective review was performed at two teaching hospitals of all pertrochanteric femur fractures (AO/OTA31-A1,2,3) treated with a trochanteric entry cephalomedullary nail from January 1, 2007 through September 30, 2014. Patients who were 55 years or older, had sustained a fracture by a low-energy mechanism, and had at least 3 months of radiographic follow-up were included. Pathologic and periprosthetic fractures were excluded. Time to cutout as well as direction of cutout were recorded. Tip-apex distance (TAD) was measured on postoperative imaging. Statistical analysis was performed with the Fisher exact test and unpaired t test.



**Results:** Of 932 charts reviewed, 362 met inclusion criteria. The average age of the patients was 83 years and 95.9% had fallen from a standing or seated height. A majority of patients had pertrochanteric fractures that were classified as unstable (64.6%). A helical blade was utilized in 93 patients and a lag screw in 269 patients, according to surgeon preference. The average length of follow up was 11.5 months. 22 cutouts occurred, 14 with helical blades (15.05%) and 8 with lag screws (2.97%). Cutout with the helical blade was significantly more frequent than with the lag screw ($P = 0.0001$). There was no difference in the prevalence of unstable fractures in those patients who had cutout versus those that did not in either group. The average TAD was significantly greater for those patients who experienced cutout both for the helical blades (23.52 mm vs 19.73 mm; $P = 0.0194$) and lag screws (24.54 mm vs 20.02 mm; $P = 0.0197$) (Figures 1-3).

**Conclusion:** When the helical blade was utilized for proximal fixation, implant cutout occurred at a significantly higher rate compared to lag screw fixation. There was not a threshold TAD that was predictive of cutout for either implant. This suggests that the higher risk of cutout is associated with the helical blade itself and not with the surgical technique. Further investigation is warranted to determine other factors that may contribute to cutout when utilizing an intramedullary device.

See pages 47 - 108 for financial disclosure information.

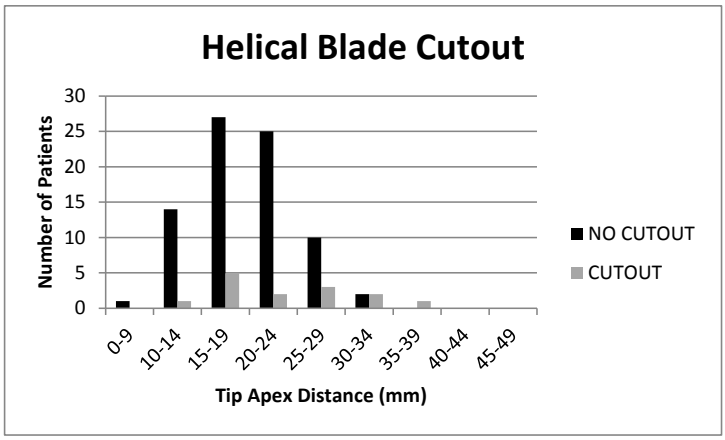


**Figure 1: Helical blade cutout.**

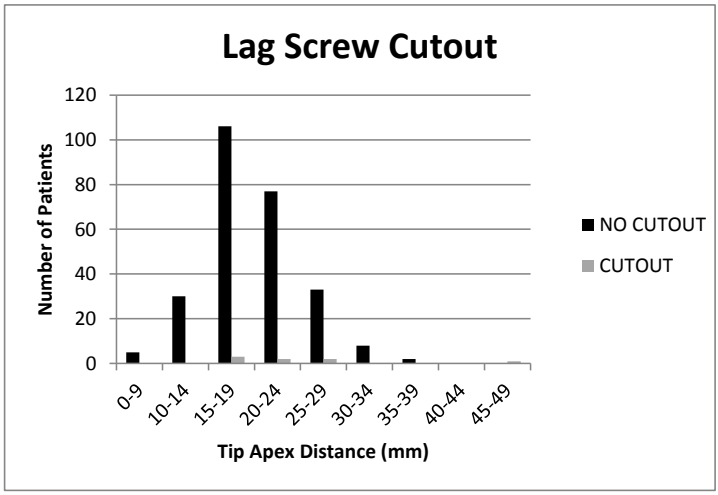


**Figure 2: Lag screw cutout.**

| | 0-9 mm | 10-14 mm | 15-19 mm | 20-24 mm | 25-29 mm | 30-34 mm | 35-39 mm | 40-44 mm | 45-49 mm |
|---|---|---|---|---|---|---|---|---|---|
| **Helical Blade (n=93)** | 0/1 | **1/15 (6.67%)** | **5/32 (15.63%)** | **2/27 (7.41%)** | **3/13 (23.08%)** | **2/4 (50%)** | **1/1 (100%)** | 0/14 | 0/14 |
| **Lag Screw (n=269)** | 0/5 | 0/30 | **3/109 (2.75%)** | **2/79 (2.53%)** | **2/35 (5.71%)** | 0/8 | 0/2 | 0/0 | **1/1 (100%)** |

**Figure 3: Percent cutout for each device by tip-apex distance.**



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.