

“Length-Stable” Fully Threaded Screw Fixation of Femoral Neck Fractures: Does it Work?

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Background/Purpose: An alternate technique of femoral neck fracture fixation with cannulated screws has emerged that utilizes a combination of both partially and fully threaded implants, the rationale for this combination being that once intraoperative compression at the fracture site is achieved initially with partially threaded screws, additional fully threaded screws will provide length-stable fixation and prevent collapse or shear through zones of comminution. This study investigates the clinical efficacy of this “length-stable” hybrid fixation construct compared to traditional methods using only partially threaded screws for compression.

Methods: Following IRB approval, patients undergoing cannulated screw fixation for femoral neck fractures between 2008 and 2012 were identified using our trauma registry. Patients were followed until bony union, failure, death, or for a minimum of 3 months. Patient age, gender, tobacco use, body mass index, and medical comorbidities were noted. Injury-related variables including mechanism, Garden classification, Pauwels angle, and associated injuries were recorded. Finally, treatment-related factors including time until surgical treatment, the need for open reduction, fixation construct, and reduction quality were assessed. Univariate analysis using a Cox proportional hazard model was used to determine relative risk of fixation type with the need for revision. Univariate logistical regression was used to determine an association between fixation type and postoperative pain and ambulation status as well.

Results: 265 femoral neck fractures were treated at our institution between 2008-2012. Of these, 72 were treated with cannulated screws in patients with a mean age of 65 years (range, 18-91). In 55 instances only partially threaded screws were employed, while 17 utilized a “length-stable” construct, using a combination of partially and fully threaded screws. 21 patients in the partially threaded group and 4 patients in the “length-stable” group were lost to follow-up, leaving 34 and 13 patients in each group, respectively, available for further retrospective review. Four patients (12%) in the partially threaded group developed a failure requiring revision to a total hip arthroplasty in 3 and a revision of fixation in 1. Five patients (38%) in the “length-stable” group developed a mechanical failure, all of whom required conversion to a total hip arthroplasty. Length-stable fixation was associated with a fourfold risk of revision when compared to standard fixation ($P = 0.04$). Length-stable fixation was also associated with increased postoperative pain ($P = 0.001$) and a need for ambulatory assistance ($P < 0.001$).

Conclusion: The addition of fully threaded screws to achieve a “length-stable” construct for the fixation of femoral neck fractures led to a significantly increased risk for revision when compared to traditional cannulated screw constructs. It is possible that length-stable constructs were selectively chosen for more unstable fracture patterns; however, this study demonstrates that adding fully threaded screws in such situations did not improve outcomes. We have abandoned this technique based on these data.

- The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an “off label” use). For full information, refer to page 600.