

Semi-Extended Versus Standard Nailing for Treatment of Distal Third Tibia Fractures: A Multicenter Study

Scott Ryan, MD¹; Vito Pugliano, MD¹; Shane Morris, MS¹; Robert French, MD²; Robert Ward, MD¹; **Andrew Marcantonio, DO, MBA²**;

¹Tufts Medical Center, Boston, Massachusetts, USA;

²Lahey Hospital and Medical Center, Burlington, Massachusetts, USA

Background/Purpose: Originally described for proximal tibia fractures by Tornetta et al in 1996, semi-extended nailing is gaining in popularity. Recent reports on semi-extended and suprapatellar nailing are expanding its indications to more distal tibia fractures. Malalignment in distal third tibia fractures treated with standard nailing has been reported in up to 29% of fractures. The semi-extended technique (performed with a partial medial parapatellar arthrotomy with the knee in 15-30° of flexion) allows the surgeon to reduce the fracture, obtain radiographs, and perform the nailing procedure without manipulating the leg. This purpose of this study is to evaluate the radiographic outcomes of distal tibia fractures treated with semi-extended nailing (knee flexion of 30°) compared to those treated with standard nailing in a hyperflexed (>90°) position.

Methods: After approval from the IRB, patients were identified using a billing database, and a retrospective chart review of those patients who sustained a distal tibia fracture and were treated with intramedullary nailing from November 2007 until January 2014 was completed. Surgeries were performed at two academic trauma centers. Multiple surgeons performed both the standard and semi-extended nailing procedures. Fractures were classified according to the AO/OTA classification type 43. The primary outcome measure was alignment at union. All patients were followed for at least 1 year. Radiographic outcomes at final follow up were measured on AP and lateral full-length tibia-fibula radiographs at fracture union by an independent orthopaedic radiologist blinded to the treatment. Malunion was defined as angulation >5° in any plane. A two-tailed Student t test was used to evaluate significance between the mean angulation at union between the two groups. A chi-squared test was used to evaluate significance between the number of patients with malaligned fractures in each group. Significance was set at P = 0.05.

Results: There were 39 patients treated with semi-extended nailing and 48 patients treated with standard nailing technique. 12 patients in both groups had intra-articular extension and this was reduced and stabilized to within 1 mm of anatomic in all cases. In the semi-extended nailing group there were 36 (92%) AO/OTA type A, and 3 (8%) type C. In the standard nailing group there were 39 (81%) type A, and 9 (19%) type C. The average angulation at union in the semi-extended group was 3.1° ± 1.7° (range, 0-5°) versus 3.6° ± 2.1° (range, 0-9°) in the standard group (P = 0.25). No patients (0%) in the semi-extended group had malaligned fractures, compared to 10/48 21% patients in the standard group (P = 0.002).

Conclusion: The semi-extended nailing technique, and its variations, is becoming a more popular way to nail tibia fractures. The technique can be used for both proximal and distal tibia fractures. Our percentage of malaligned patients in the standard group is similar to previous studies. We had significantly more patients with malalignment in the standard group compared to the semi-extended group.

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.