

Immediate Weight Bearing as Tolerated has Improved Outcomes Compared to Non-Weight Bearing after Intramedullary Fixation for Subtrochanteric Fractures

Brian Miller, MD¹; Brian P Cunningham, MD²; Anthony Rhorer, MD¹; Gilbert Ortega, MD, MPH¹; Hrayr Basmajian, MD³; Justin Roberts, MD⁴; Kelly Jackson, NP⁵; Saif Zaman, MD⁶;

¹Sonoran Orthopaedic Trauma Surgeons, Scottsdale, Arizona, USA;

²Orthopaedic Trauma Fellow, University of California, San Francisco (UCSF) and San Francisco General Hospital (SFGH), Orthopaedic Trauma Institute, San Francisco, California, USA;

³Loma Linda University Medical Center, Anaheim Hills, California, USA;

⁴Banner Good Samaritan Ortho Residency, Phoenix, Arizona, USA;

⁵Scottsdale Orthopaedic Institute, Scottsdale, Arizona;

⁶Loma Linda University Medical Center, Loma Linda, Arizona

Background/Purpose: Subtrochanteric femur fractures are commonly managed with operative fixation; however, they have a high complication rate including malunion, nonunion, and implant failure because of cortical comminution and stress concentration during stance. While the angled blade plate has been the gold standard for treatment, the last decade has seen a rise in the use of intramedullary fixation with new biomechanical data. Previous studies demonstrated satisfactory outcomes with a soft-tissue-friendly approach and avoiding varus malreduction; however, these studies utilized protected weight bearing for 6 to 8 weeks. The literature clearly demonstrates the benefit of early weight bearing in trauma patients and the safety of statically locked intramedullary nails in highly comminuted femoral shaft fractures. The literature has limited data to support immediate postoperative weight bearing after intramedullary fixation of subtrochanteric femur fractures. Our hypothesis was that immediate postoperative weight bearing as tolerated (WBAT) for subtrochanteric femur fractures would result in decrease length of stay (LOS) compared to non-weight bearing (NWB).

Methods: After IRB approval a retrospective cohort study was conducted from August 2009 to November 2015 at two Level I trauma centers. Inclusion criteria were skeletally mature patients with a subtrochanteric femur fracture (OTA 31A3.3 and 32A1.1-32A3.3). Exclusion criteria was presentation GCS (Glasgow Coma Scale) below 8, orthopaedic injury affecting weight bearing, thoracic or abdominal injury requiring surgery, periprosthetic fracture, and bisphosphonate-related atypical subtrochanteric femoral fractures. 69 patients met the inclusion criteria and underwent intramedullary fixation. These cohorts were compared using Wilcoxon rank sum test for statistical significance. Patients were evaluated regarding age, sex, mechanism of injury, implant type, implant size, degree of comminution, and fracture type. Primary outcome was total LOS, with subgroup analysis of high-energy cohort.

Results: The mean patient age was 55.7 years (range, 19-95) with a bimodal distribution of 36.5 (range, 19-66) and 73.4 (range, 59-95) for high and low-energy, respectively. Implant choice was predominantly cephalomedullary nail (83%, n = 57), followed by reconstruction (13%, n = 9) and standard piriformis entry (4%, n = 3). The nail diameter was predominantly 10 mm (75%, n = 52) followed by 11.5 mm (13%, n = 9). Overall the WBAT group had a decreased LOS compared to the NWB group (5.9 vs 4.5, P = 0.01). While the high-energy group had a longer overall LOS compared to the low-energy group (5.3 vs 4.4, P = 0.01),

a subgroup analysis of high-energy patients with highly comminuted fracture patterns (Winqvist-Hansen grade 3 or 4) had a decreased LOS when allowed WBAT as compared to NWB (5.1 vs. 7.0, $P = 0.01$). There was no statistical difference in the union rates or implant failures between groups.

Conclusion: This study demonstrates that immediate postoperative weight bearing of subtrochanteric femur fractures decreased length of stay and does not appear to increase the risk of implant failure or nonunion. Our data also suggest that in a high-energy cohort with highly comminuted subtrochanteric fracture patterns, immediate WBAT protocol may lead to decreased LOS and has similar safety with implant sizes of 10 mm. We plan to continue studying the effect of early WBAT on subtrochanteric fractures and the effect on patient-reported outcomes.