Distal Femur Fracture Outcomes and Complications of Dual-Implant Fixation Compared to Single-Plate Fixation

Nick G. Bostrom, BA*; Sandy Vang, BA; Gennadiy Busel, MD; Erik A. Lund, MD; Mai P. Nguyen, MD*
Regions Hospital/ U of MN, Saint Paul, Minnesota, UNITED STATES

Purpose: While distal femur fractures are traditionally treated with single-plate fixation, this method has been associated with a 20% nonunion rate. In addition, patients are usually limited with weightbearing restriction, which in turn causes other complications. Recently, there has been significant interest in dual-implant fixation for distal femur fractures to improve union rate and shorten time to full weightbearing. The purpose of this study is to evaluate the utilization trend of dual-implant fixation in recent years at our institution and to compare outcomes and complications between patients treated with dual implant versus single implant for distal femur fractures.

Methods: A retrospective review was completed for distal femur fractures treated with surgical fixation from January 2019 to March 2021. We excluded <18 years, nonambulatory patients, revision surgeries, and patients with less than 90 days of follow-up. A chart review was performed to collect age, gender, body mass index (BMI), smoking, treatment, time to weightbearing, and complications (defined as reoperation, readmission, thromboembolic events, pneumonia, and nonunion at 3 months). Comparisons between the single implant versus dual implant group were performed using t test, $\chi 2$, and Fisher's exact test where appropriate. Statistical significance was set at $\alpha = 0.05$.

Results: There were 194 patients and 199 fractures with the mean age of 70.2 ± 17.4 years. 178 fractures were in the single-implant group (89.4%) and 21 in the dual-implant group (10.6%). For the single-implant group, 140 were women (78.6%), the mean BMI was 29.0 ± 7.7 years, and 54.5% (97/178) had a positive smoking history. In the dual-implant cohort, 18 were women (85.7%), the mean BMI was 30.3 ± 8.6, and 42.9% (9/21) had a positive smoking history. The utilization of the dual-implant technique increased from 3.8% in 2019 to 16.67% in 2020 to March 2021. Where captured, mean time to weightbearing as tolerated (WBAT) in the single-implant group (n = 157) was 8.8 ± 4.7 weeks compared to 5.6 ± 4.4 weeks in the dual-implant fixation group (n = 17) (P = 0.01). We observed 10 nonunions in our series with all 10 occurring in the initial single-implant fixation group. The nonunion rates were 5.6% (10/178) for the single implant versus 0% (0/21) patients in the dual-implant groups (P = 0.60).

Conclusion: Compared with the literature's reported single-plate nonunion rate of 20%, we reported a lower complication rate. This rate is further reduced with dual-implant application.