

**Management of Low Periprosthetic Distal Femoral Fractures:
Plate Fixation Versus Distal Femoral Endoprosthesis**

*Lauren Alice Ross, MBChB; Oisín Keenan, MBChB; Matthew Magill, MBChB;
Nicholas D. Clement; Matthew Moran, MSc; James Patton, MD; Chloe Scott, FRCS
Edinburgh Orthopaedics, Edinburgh, United Kingdom*

Purpose: Debate continues regarding the optimum management of periprosthetic distal femoral fractures (PDFFs) at the level of well-fixed femoral components. This study aims to determine which operative treatment strategy is associated with the least perioperative morbidity and mortality when treating low (Su type II and III) PDFFs: lateral locking plate fixation (LLP-ORIF [open reduction and internal fixation]) or distal femoral replacement (DFR).

Methods: This was a retrospective cohort study of 60 consecutive unilateral PDFFs of Su types II (40) and III (20) in patients ≥ 60 years old: 33 underwent LLP-ORIF (mean age 81.3 ± 10.5 , body mass index [BMI] 26.7 ± 5.5 ; 29 female), and 27 underwent DFR (mean age 78.8 ± 8.3 ; BMI 26.7 ± 6.6 ; 19 female). The primary outcome measure was reoperation. Secondary outcomes included perioperative complications, calculated blood loss, transfusion requirements, functional mobility status, length of acute hospital stay, discharge destination, and mortality. Kaplan-Meier survival analysis was performed. Cox multivariable regression analysis was performed to identify risk factors for reoperation after LLP-ORIF.

Results: PDFFs occurred at mean 9.5 ± 5.2 years after primary total knee arthroplasty. The mean length of follow-up was 3.8 years (range, 1.0-10.4). One-year mortality was 13% (8 of 60). Reoperation was more common following LLP-ORIF: 7 of 33 vs 0 of 27 ($P = 0.008$). Five-year survival for reoperation was significantly better following DFR: 100% compared to 70.8% (51.8-89.8 95% confidence interval) ($P = 0.006$). There was no difference for the end point mechanical failure (including radiographic loosening): ORIF 74.5% (56.3-92.7); DFR 78.2% (52.3-100); $P = 0.182$. Reoperation following LLP-ORIF was independently associated with medial comminution: hazard ratio (HR) 10.7 (1.45-79.5, $P = 0.020$). Anatomic reduction was protective against reoperation: HR 0.11 (0.013-0.96, $P = 0.046$). When inadequately fixed fractures were excluded there was no difference in 5-year survival for either reoperation ($P = 0.156$) or mechanical failure ($P = 0.453$).

Conclusion: Absolute reoperation rates are higher following LLP fixation of low PDFFs compared to DFR. Where LLP-ORIF was well performed with augmentation of medial comminution, there was no difference in survival compared to DFR. Although necessary in very low fractures, DFR should be used with caution in patients with a life expectancy exceeding 5 years.