Exchange Retrograde Femoral Rodding Results in Worse Functional Outcomes Compared to Exchange Antegrade Femoral Rodding

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Purpose: Since the late 1990s, the percentage of femoral rods placed with retrograde techniques has increased such that it has become the standard of care for diaphyseal fractures, without any demonstrable deleterious effects on knee function. However, the impact of exchange rodding for femoral nonunion with multiple procedures through the knee joint has not yet been investigated. The purpose of this study was to measure pain and functional deficit following exchange rodding entirely through a retrograde approach compared to patients who were managed entirely through a repeated antegrade approach.

Methods: Skeletally mature patients who had undergone exchange rodding of the femur for nonunion or delayed union from 2011 to 2021 at a Level I trauma center were identified. Group R consisted of patients treated with retrograde femoral rods for both the index procedure and the revision procedure. Group A consisted of patients treated with antegrade femoral rods for both procedures. Patients were assessed for range of motion, and functional outcomes using the Short Form-12 (SF-12), PROMIS (Patient-Reported Outcomes Measurement Information System) Pain Interference (PI), PROMIS Physical Function (PF) and Modified Harris Hip Score (MHHS).

Results: 40 patients (18 in Group R and 22 in Group A) were available for functional assessment at a minimum of 5 months after their final rodding procedure. There were no significant differences between Group R and Group A in age (56 years [range, 26 to 81 years] vs 52 years [range, 26 to 77 years], $P = 0.522$) and follow-up from time of exchange surgery (30 months [range, 6 to 75 months] vs 48 months [range, 7 to 114 years], $P = 0.147$). There were no significant differences in American Society of Anesthesiologists (ASA), body mass index (BMI), and PF, active knee extension, or number of surgical procedures between groups ($P>0.05$). Patients in Group R reported significantly worse MHHS (45.6 vs 65.2 $P<0.001$), PI scores (average 65 vs 55, $P = 0.006$), and active knee flexion (average 101° vs 122°, $P = 0.04$) when compared to patients in Group A.

Conclusion: Exchange femoral rodding for nonunion through a retrograde approach is associated with more pain, worse function, and decreased knee range of motion compared to patients managed through an antegrade approach. This study is the first to address the functional implications of exchange femoral rodding through the knee joint. Repeat surgery through a retrograde approach is not a benign procedure, and clinicians and patients should be aware of its potentially additive effects on knee function and pain.