

Distal Interlocking Screw Backout in New-Generation Retrograde Femoral Nails

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INTRODUCTION:

Two new-generation retrograde femoral nails, the DePuy Synthes RFN-Advanced (RFNA) and the Stryker T2 Alpha (T2 Alpha), differ in their distal interlocking designs. Recent studies have raised concerns about distal interlocking screw backout with the RFNA, reporting rates as high as 23–30%. The primary objective of this study was to compare distal interlocking screw backout rates between the RFNA and T2 Alpha.

METHODS: This retrospective comparative study included patients aged ≥ 18 years who underwent operative fixation with the RFNA or T2 Alpha for a diaphyseal or distal femur fracture (OTA/AO 32-33) between November 2022 and August 2024 at three Level 1 trauma centers. The primary outcome was the distal interlocking screw backout rate. Secondary outcomes included time to backout and reoperation rates for screw removal. Outcomes were compared between the RFNA and T2 Alpha.

RESULTS: A total of 103 patients (median age 59 years [IQR: 38–73], 61% female) were included, comprising 63 OTA/AO 32 and 40 OTA/AO 33 fractures, with 24 treated with the RFNA and 79 with the T2 Alpha. Backout rates were higher in the RFNA group (38% [95% CI: 20–59%] vs. 5.1% [95% CI: 1.6–13%], $p < 0.001$). Stratified by fracture location, backout rates remained higher in the RFNA group for both diaphyseal (6/20 [30%] vs. 1/43 [2.3%], $p = 0.003$) and metaphyseal fractures (3/4 [75%] vs. 3/36 [8.3%], $p = 0.008$). Time to backout was earlier in the RFNA group (5 weeks [IQR: 3–6] vs. 19 weeks [IQR: 14–31], $p = 0.013$). Reoperation rates for screw removal were higher in the RFNA group (21% vs. 0%, $p < 0.001$). The median follow-up for the overall cohort was 27 weeks (IQR: 18–41).

DISCUSSION AND CONCLUSION: The RFNA was associated with a significantly higher rate of distal interlocking screw backout, an earlier time to backout, and an increased reoperation rate for screw removal compared to the T2 Alpha. These findings can guide surgeons in implant selection and highlight the need for solutions to mitigate distal interlocking screw backout in the RFNA.



Figure 1. Case example of a 72-year-old female with osteoporosis treated with the DePuy Synthes RFN-Advanced Retrograde Femoral Nail for a low-energy distal femur fracture. A) Anteroposterior and lateral radiographs at the time of injury. B) Immediate postoperative radiographs following open reduction and fixation, demonstrating appropriate alignment. C) Six-week follow-up radiographs showing sagittal translation of the fracture and backout of the proximal and distal lateral-to-medial interlocking screws. The patient subsequently underwent reoperation for screw removal.