

**Managing Femoral Neck Fractures in Adults Less than 50 Years of Age:
The Effects of Technical Errors on Outcomes in a Large, Multicenter Population**

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Purpose: Technical errors (TEs) in the repair of femoral neck fractures have been described that affect outcomes, including malreduction, a poor tip-apex distance (TAD) with a sliding hip screw device, or independent cannulated screw constructs that do not reach subchondral bone (“too short”), do not have support of the medial cortex (“no calcar support”), or are poorly spaced. Femoral neck fractures in young adults are associated with a high rate of treatment failures and poor outcomes. The purpose of this study was to evaluate the effects of TEs on outcomes after the repair of femoral neck fractures in young adults.

Methods: We retrospectively reviewed 492 femoral neck fractures in young adults at 26 North American Level I trauma centers. All of these fractures underwent operative repair between 2005 and 2017. The association between TEs, including malreduction and deviation from standard use of typical implants (ie, TAD for sliding hip screws and screw placement for independent cannulated screw constructs) and treatment failure (failed fixation, nonunion, osteonecrosis, malunion, and the need for subsequent major reconstructive surgery [arthroplasty or proximal femoral osteotomy]) were examined using logistic regression analyses.

Results: Overall, of 492 femoral neck fractures repaired. A TE was observed in 245 fractures (50%) undergoing surgical treatment. For 377 displaced fractures, TEs were seen in 53% of fractures, with 2 or more TEs seen in 10% of fractures. Treatment failures occurred in 27% of those cases without a TE, compared to 56% with 1 TE, and 86% of those with ≥ 2 TEs. TEs were less frequent in nondisplaced fractures compared to displaced ones (39% vs 53%) and were less frequently associated with poor outcomes compared to displaced fractures with TE (22% vs 62%). TEs with nondisplaced fractures increased the need for major reconstructive surgery (20% vs 9%), but otherwise did not significantly increase the other outcomes measured.

Conclusion: TEs were found in half of femoral neck fractures in young adults undergoing operative repair, and the occurrence and number of TEs was associated with treatment failure. A thoughtful approach with preoperative planning and well-executed techniques may lead to improved outcomes for patients with this difficult injury pattern.