

## **What Factors Increase Revision Surgery Risk When Treating Displaced Femoral Neck Fractures With Arthroplasty: A Secondary Analysis of the HEALTH Trial**

*Michael Blankstein MD; Emil H Schemitsch MD; Sofia Bzovsky MSc; Rudolf W Poolman MD; Frede Frihagen MD; Daniel Axelrod MD; Diane Heels-Ansdell MSc; Mohit Bhandari MD; Sheila Sprague PhD; Patrick Christopher Schottel MD; HEALTH Investigators FRCS (Ortho)*  
McMaster University, Hamilton, ON, Canada

**Purpose:** The HEALTH trial is a large multicenter randomized controlled trial comparing total hip arthroplasty with hemiarthroplasty in patients 50 years of age or older who sustained a low-energy displaced femoral neck fracture. The primary outcome of the study was unplanned revision surgery within 24 months of the initial surgery. No significant short-term differences between treatment arms was observed. The primary objective of this secondary HEALTH trial study was to perform an analysis of the patient and surgical factors associated with revision surgery within 24 months following hip fracture.

**Methods:** We identified 8 potential factors a priori that may be associated with revision surgery. Factors were selected based on biological rationale, previous literature, and expert opinion. These factors included age, body mass index (BMI), major comorbidities, independent ambulation, type of surgical approach, length of operation, use of femoral cement, femoral head size, and degree of femoral stem offset. Our statistical analysis was a multivariable Cox regression using the HEALTH trial primary outcome of reoperation within 24 months of initial surgery as the dependent variable.

**Results:** 1441 patients were included in the HEALTH trial. Mean age was 79 years (standard deviation 8) and 70% (1009/1441) were female. 8.1% of patients (117/1441) required revision surgery after 24 months. We were unable to identify any patient or surgical factors associated with increased risk of revision surgery at 24 months. Age, BMI, major comorbidities, independent ambulation status, surgical approach, operative time, use of cemented or uncemented femoral components, femoral head size, and femoral stem offset were not found to be predictors of revision surgery ( $P > 0.05$ ).

**Conclusion:** As shown in the HEALTH trial, both total and partial hip replacements are very successful procedures with very low revision and reoperation rates in lower-energy displaced femoral neck fracture patients. We were unable to identify any patient or surgeon-controlled factors that significantly increased the need for revision surgery. All techniques, approaches, and implants used did not seem to affect these excellent arthroplasty outcomes in this elderly predominately female patient population. One should proceed with caution when attempting to generalize these results to a younger, more active hip fracture population.