

## **The Evolution of Revision Total Hip Arthroplasty and Impact on the Experience of Trainees**

Stefano Muscatelli<sup>1</sup>, Henry Ho<sup>2</sup>, Robert Hopper, John Robert Dunn, Robert A Sershon<sup>3</sup>, Kevin B Fricka<sup>3</sup>, William George Hamilton

<sup>1</sup>University of Michigan, <sup>2</sup>Anderson Orthopaedic Research Institute, <sup>3</sup>Anderson Orthopaedic Clinic

### **INTRODUCTION:**

Advances in total hip arthroplasty (THA) have resulted in evolving revision indications and intraoperative techniques, which can influence the exposure of residents and fellows to complex cases. The goal of this study is to report three decades of revision experience from a tertiary referral center that trains fellows, comparing the reasons for revision and complexity of revisions over time.

### **METHODS:**

We retrospectively reviewed all revision THA performed at our institution from 1990-2022. Revision diagnosis, components revised, types of revision implants used, and exposure techniques were collected. A “complex” revision was defined as a case that involved an extended trochanteric osteotomy (ETO), triflange/cup-cage construct, or acetabular augment.

### **RESULTS:**

A total of 3,556 THA revisions were identified, with an average of 108 revisions yearly. The percent of revision THA of all THA cases performed gradually decreased from 28.2% (475/1682) in 1990-1994 to 9.3% (497/5331) in 2018-2022, related to an increase in primary THA volume. Aseptic loosening was the most common indication in 1990-1999 (average 45/year) but decreased to 28.3/year in 2010-2019. From 1990-1999 to 2010-2019, fracture increased from 3.1/year to 7.3/year, infection from 2.9/year to 16.9/year, and metallosis from 0.1/year to 13.2/year. Both components were most commonly revised in 1990-1994 (42.6/year), while polyethylene exchange was most common in 2010-2019 (43.3/year). A decrease was observed in “complex” cases over time: 14.8 ETOs/year were performed in 2000-2004 compared to 5.4/year in 2018-2022, 4.5 triflange/cup-cage constructs/year were utilized in 2004-2007 compared to 0.8/year in 2018-2022, and 4 acetabular augments/year were utilized in 2009-2012 compared to 1/yr in 2018-2022.

### **DISCUSSION AND CONCLUSION:**

Annual revision THA volume has remained relatively constant over time, but the indications for revision have changed over the decades. The number of “complex” revisions has gradually decreased, presumably due to advances in implants and materials. If this trend extends to other training institutions, the next generation of arthroplasty surgeons will have less exposure to complex revisions during their training.