

Press-Fit versus Loose Fit Stems and Risk for Surgical Outcomes following Radial Head Arthroplasty: A US-Based Cohort Study of 1,575 Patients

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INTRODUCTION: Radial head arthroplasty (RHA) is used to reconstruct comminuted radial head fractures. Implants can be categorized by stem fit: press-fit or loose-fit. Currently, the RHA literature does not suggest one implant type is superior to another based on revision and reoperation rates, although most RHA outcome studies have small numbers of patients with few events to detect a difference. The purpose of this study was to evaluate the association between stem type and risk of revision and reoperation following RHA.

METHODS: A total of 1,575 patients aged ≥ 18 years who underwent primary RHA within a US-based healthcare system were identified (2009-2021). Revision following the index RHA was the primary outcome of interest; ipsilateral reoperation was a secondary outcome. Multivariable Cox proportional hazard regression was used to evaluate the risk of outcomes by loose-fit versus press-fit with the adjustment for confounders. Analysis was performed for the overall cohort and for the subset of patients who had multiple extremity procedures performed during the RHA. Hazard ratios (HR) and 95% confidence intervals (CI) are presented. A $P < 0.05$ was considered statistically significant.

RESULTS:

Of the 1,575 RHA, 681 (43.2%) received a loose-fit stem. Mean age for the cohort was 54.3 years (standard deviation [SD]=15.1); more patients were Non-Hispanic White, female, and obese.

The cumulative revision probability at 10-years follow up was 1.8% for loose-fit and 2.9% for press-fit. Mean time to first revision for those who experienced a revision was 3.6 years (SD=3.5). In adjusted analysis, we found no difference in risk of revision for loose-fit when compared to press-fit (HR=0.70, 95% CI=0.33-1.47, $p=0.340$). Figure 1 shows the adjusted postoperative cumulative incidence of RHA revision in loose-fit vs. press-fit stems (Grey's Test $P=0.135$). Top reasons for revision were stiffness, instability, and pain due to loosening.

Ten-year cumulative reoperation probabilities were 4.1% for loose-fit and 4.7% for press-fit; no difference reoperation risk between stem type was found in adjusted analysis (HR=0.76, 95% CI=0.45-1.26). Figure 2 shows the adjusted postoperative cumulative incidence of RHA reoperation in loose-fit vs press-fit stems (Grey's Test $P=0.688$).

Additionally, there were no differences in risk of revision or reoperation in the patient subgroup who underwent additional procedures in the same extremity at the time of RHA (revision: HR=0.58, 95% CI=0.24-1.43, $p=0.238$; reoperation: HR=1.16, 95% CI=0.65-2.11, $p=0.610$).

DISCUSSION AND CONCLUSION: In this large multi-center cohort of 1,575 primary RHA over a 12-year period, we found no difference in risk of revision or reoperation following RHA based upon stem type.

