

# Collared versus Collarless Stems in Primary Total Hip Arthroplasty: A Systematic Review and Meta-Analysis

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**INTRODUCTION:** Periprosthetic femur fractures (PPF) remain a major complication following total hip arthroplasty (THA) and are expected to increase along with the number of total hip arthroplasties performed. The use of a collared femoral component has been suggested as a potential method to mitigate this issue. Several studies attempted to report differences between collared and collarless uncemented stems. However, there is no consensus on which femoral implant design is preferable. Herein, we performed a systematic review and meta-analysis aiming to compare collared and collarless femoral stem implants regarding PPF, all-cause revision, and aseptic loosening.

**METHODS:** This study was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. PubMed, Embase, and Cochrane databases were systematically searched to identify relevant studies since the date of inception to December 5, 2022. All clinical studies (observational, cross-sectional, cohort, or RCT) that directly compare collared and collarless stems regarding PPF, subsidence, and revision rates were included. A random effects model meta-analysis was conducted and the  $I^2$  statistic was used to assess for heterogeneity.

**RESULTS:** Nine studies, with a total of 50,346 patients (20,499 collared; 29,847 collarless), were included in the final analysis. Follow up ranged from 6 to 132 months, the mean age was  $67 \pm 5$  years, and 38% (18,996/50,115) were male. Collared stems were associated with significantly lower rates of postoperative PPF (OR: 0.43, 95% CI: 0.31-0.61,  $I^2$ : 15.6%) compared to collarless stems (Figure 1). Random effects model meta-analysis also demonstrated significantly lower rates of all-cause revision surgery for the collared stems group (OR: 0.27, 95% CI: 0.10-0.75,  $I^2$ : 34.5%), which was also associated with significantly lower rates of aseptic loosening (OR: 0.57, 95% CI: 0.43-0.77,  $I^2$ : 0.0%), as seen in Figures 2 and 3, respectively.

**DISCUSSION AND CONCLUSION:** Collared stems were associated with significantly lower PPF, mortality, and aseptic loosening rates compared with collarless stems. Prospective randomized controlled trials are warranted to validate our results as the current literature is inconclusive, due to heterogeneity in indications for each stem design and outcome reporting. A standardized method of reporting stem subsidence and/or loosening should be developed to better assess how stem design is associated with these complications.

