

Older Patients Experience Non-Inferior One-Year Functional Outcomes Following Cementless Primary Total Knee Arthroplasty Compared to Younger Patients

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INTRODUCTION: Cementless fixation in primary total knee arthroplasty (TKA) has seen increasing adoption, as reflected in national joint registry trends. Although traditionally favored for younger patients with robust bone quality, cementless TKA may also be appropriate for select older individuals. While prior studies have primarily focused on implant survivorship, there remains a paucity of data evaluating age-related differences in functional outcomes following cementless TKA. Therefore, we aimed to compare clinically meaningful improvements in 1-year patient-reported outcomes (PROMs) following primary cementless TKA among 3 age groups (≤ 60 , 60-70, >70 years).

METHODS: A prospective cohort of all adult patients who underwent unilateral, fully uncemented primary TKA ($n=1772$) for osteoarthritis between 2016–2023 from a single healthcare system was analyzed. Of the total cohort, 57% were males and 88% were White. Patients were grouped based on age at surgery into ≤ 60 years ($n=600$), 60-70 years ($n=752$), and >70 years ($n=420$). Multivariable logistic regression models were used to compare 1-year PROMs between the three groups using odds ratio (OR) and 95% confidence interval (CI). The included PROMs were the Knee disability and Osteoarthritis Outcome Score (KOOS) Pain, Physical function Shortform (PS), Joint Replacement (JR), and Veterans Rand-12 Mental Composite Scores (VR-12 MCS). Clinically relevant improvements were assessed through minimal clinically important difference (MCID) and Patient Acceptable Symptom State (PASS) threshold achievement. The models were controlled for pre-specified demographics, baseline PROMs, and surgical confounding variables. Failure to reach the threshold was modeled and considered as the event of interest in all the models. Additionally, 1-year satisfaction was compared. A p -value <0.05 was considered statistically significant.

RESULTS: In comparison to TKA patients aged ≤ 60 years, patients aged 60-70 years had a lower risk of not achieving MCID for KOOS-JR (OR=0.58, 95% CI 0.35-0.94, $p=0.02$), PASS for KOOS-Pain (OR=0.75, 95% CI 0.56-0.99, $p=0.04$), and PASS for KOOS-PS (OR=0.75, 95% CI 0.57-0.99, $p=0.04$). However, comparing the two groups (60-70 vs. ≤ 60 years) showed no significant differences in achieving MCID for KOOS-Pain ($p=0.05$), MCID for KOOS-PS ($p=0.06$), MCID for VR12-MCS ($p=0.73$), and PASS for KOOS-JR ($p=0.06$). When comparing TKA patients aged >70 years vs. ≤ 60 years, there were no statistically significant differences in achieving MCID for KOOS-Pain ($p=0.25$), KOOS-PS ($p=0.84$), KOOS-JR ($p=0.59$), and VR12-MCS ($p=0.62$), and PASS for KOOS-Pain ($p=0.15$), KOOS-PS ($p=0.63$), and KOOS-JR ($p=0.24$). Patient satisfaction at 1 year, as measured by the PASS question, did not differ significantly between age groups (60–70 vs. <60 , $p=0.61$; >70 vs. <60 , $p=0.73$).

DISCUSSION: Overall, one-year functional outcomes and patient satisfaction following cementless primary TKA were comparable across age groups, with only modest differences observed in the achievement of certain PROM thresholds. These findings suggest that, when carefully selected, older adults can experience similar benefits from cementless TKA as their younger counterparts. However, further data-driven research is needed to evaluate how age and bone density influence long-term implant survivorship and patient-reported outcome measures (PROMs).

CLINICAL RELEVANCE: Well-selected adults ≥ 70 years undergoing cementless primary TKA achieve one-year functional improvement and satisfaction comparable to younger patients. Chronologic age alone should not preclude cementless fixation.