

Comparable pain and functional outcomes in the first 6 months following cemented vs. cementless total knee arthroplasty: a systematic review

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INTRODUCTION:

The use of cementless total knee arthroplasty (TKA) has increased over the past decade due to its favourable long-term survivorship, faster procedural time, and the rise in younger patients undergoing TKA. While cemented and cementless fixation methods are known to yield similar long-term outcomes, short-term recovery is less clearly defined. It has been theorized that cementless TKA is associated with more pain in the early months following surgery due to peri-prosthetic micromotion, before osseointegration is complete. Therefore, this systematic review aimed to compare post-operative pain and functional outcomes in cemented versus cementless TKA within the first 6 months following surgery.

METHODS:

This review followed the PRISMA 2020 guidelines and was registered with PROSPERO (CRD420251000442). A literature search was performed on PubMed, Embase, MEDLINE, Scopus, and Web of Science for randomized controlled trials comparing patient reported outcomes (PROs) in cemented versus cementless primary TKA. Studies focusing on hybrid fixation, uni-compartmental replacement, or revision surgeries were excluded. The data extracted included validated PRO measures such as the Visual Analog Scale (VAS) for pain, Forgotten Joint Score (FJS), Oxford Knee Score (OKS), and the Knee Society Score (KSS), specifically recorded within 6 months following surgery. When a given PRO measure was used by at least two studies at the same post-operative timepoint, these data were pooled using a random effects model and were reported as standard mean differences (SMD) with 95% confidence intervals (CI). Heterogeneity was calculated using the I^2 statistic. Finally, PROs and their associated p-value and post-operative timepoint were collected from each study.

RESULTS:

Eight randomized controlled trials were included in the review, which were published between 2006 and 2024. A total of 706 primary TKAs were assessed (336 cemented, 370 cementless), and patient age ranged from 55 to 68 years old. Implant type varied between studies, including Zimmer NexGen Cruciate Retaining, Stryker Triathlon, Advanced Coated System by Implantcast, Scorpio Series-7000, and Profit TKA systems. The meta-analysis found no significant difference between cemented and cementless fixation for the VAS at 4-6 weeks (SMD 0.14 [-0.11, 0.39], $p = 0.279$), FJS at 4-6 weeks (SMD -0.09 [-0.35, 0.18], $p = 0.509$), KSS at 3-4 months (SMD -0.12 [-0.90, 0.66], $p = 0.767$) and 1 year (SMD -0.13 [-0.52, 0.26], $p = 0.510$), and OKS at 1 year (SMD -0.05 [-0.31, 0.21], $p = 0.709$). Heterogeneity was low for most of these pooled analyses, with an I^2 of 33% or less. Within the 35 PROs recorded across all studies and timepoints, 33 showed no significant difference between groups.

DISCUSSION AND CONCLUSION:

Comparable pain and functional outcomes were found between cemented and cementless primary TKA in the 6 months following surgery. These results suggest that surgeons may use either fixation method in younger patients without compromising early recovery. This will help set realistic expectations for recovery, as well as guide shared decision making with patients. Future research should investigate outcomes according to specific patient characteristics, such as age and bone quality, to identify patients who are best suited for biological fixation.