

Executive Summary

Publication	Clinical outcomes of ceramic femoral prosthesis in total knee arthroplasty: a systematic review. Xiang S, Zhao Y, Li Z, Feng B, Weng X. J Orthop Surg Res. 2019 Feb 19;14(1):57. doi: 10.1186/s13018-019-1090-4. Review. https://www.ncbi.nlm.nih.gov/pubmed/30782186 (PMC free full text)
Study	Systematic review (single-arm studies)
Implant	Knee endoprotheses with all-ceramic components and a knee endoprosthesis made of a metal alloy with a thin ceramic surface layer.
Patients	1245 (1438 TKA)
Follow-up	12 months to more than 18 years
Method	This is the first systematic evaluation of knee endoprotheses with femoral ceramic components to assess the clinical and radiological results as well as the survival rate. The relevant literature was searched until March 2017 in the databases MEDLINE, EMBASE, Cochrane and ClinicalTrials.gov. Only articles in English were included in the study. The initial search resulted in 147 articles, 14 of which met the defined inclusion and exclusion criteria and were included in the analysis. A ceramic femoral component had been implanted in all studies. In 3 studies the results of ceramic knee endoprotheses were compared with metal knee endoprotheses. The data on the ROM, the knee scores HHS and KSS were taken from the included studies. On functional results, 2 studies included data on ROM and 7 studies on flexion and/or extension. Data on HHS were available in 4 studies and on KSS in 6 studies.
Results	The functional results improved significantly postoperatively after TKA with ceramic components. An increased ROM, greater flexion and an improvement of the HHS and KSS scores in the short and long-term course were observed. Revisions due to wear, aseptic loosening and prosthesis fracture were rare. Wear was found only in 3 cases, after a follow-up of 18.1 years. The second most common reasons for revision were infection and fracture as a result of postoperative trauma. Implant-related complications (prosthesis fracture) were observed in 3 cases with a follow-up of at least 5 years, whereby only the literature sources (<i>Akagi et al. 2000, Ahmed et al. 2015, Nakamura et al. 2017</i>) were cited in the review, but no detailed information was included (<i>The questions by email were not answered by the authors</i>). These seem to be older generations of ceramics.

Key Points	This is the first review to provide evidence of the clinical safety and long-term behavior of ceramic components in knee endoprosthesis. The following implants were included in the review: ceramic knee components made of first-generation alumina ceramics (only femur; femur and tibia; Kyocera, Japan), femoral knee components made of modern mixed oxide ceramics (Multigen Plus Ceramic, Lima Corporate, Italy), the world's only all-ceramic knee system (femur, tibia) made of modern, proven mixed oxide ceramics (BPK-S Integration Ceramic, PETER BREHM GmbH, Germany) and also non-full-ceramic femoral knee components made of Oxinium™ (Smith & Nephew, USA). Oxinium™ is a metal alloy (97.5% zirconium, 2.5% niobium). An oxidation and heat treatment process produces a 5-7 µm thin surface layer of zirconia ceramic (<i>Good V et al., JBJS 2003; Smith & Nephew, Oxinium™ published articles compendium</i>). The excellent results confirm the clinical efficiency and safety of TKA with all-ceramic components.
Abbreviations	HHS - Hospital for Special Surgery Knee Score, KSS - Knee Society Score, TKA - total knee arthroplasty, ROM - range of motion