

# Metal-Backed Cementless Patellar Components in Primary Total Knee Arthroplasty: A Review of 707 Cases

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**INTRODUCTION:** The use of cementless Total Knee Arthroplasty (TKA) implants has continued to increase over the past decade. 1<sup>st</sup> generation cementless metal-backed patellar components demonstrated high failure rates due to multiple factors including use of conventional polyethylene leading to osteolysis and bone loss. 2<sup>nd</sup> generation metal-backed patellar implants were developed with improvements in component design and polyethylene wear characteristics. Given the resurgence of cementless TKA usage especially in younger and active patients, the purpose of this study was to evaluate the clinical outcome of a 2<sup>nd</sup> generation cementless, metal-backed patellar component with a current design TKA implant.

**METHODS:** This was an IRB-approved retrospective review from a single institution of 707 primary TKAs using a cementless, metal-backed patellar implant at a mean 7-year follow-up (range 2-12 years). 818 consecutive cementless TKAs were identified with 111 lost to follow-up (13.6%), leaving 707 with minimum 2-year follow-up available for review. There were 409 females and 298 males with mean age of 63 years (34-87) and mean BMI of 34.3 (18.8-64.5). Patient selection for cementless TKA was based on age and bone quality. All procedures were performed using the same cementless implant design, anesthesia, and postoperative protocols. Clinical outcomes evaluated included patient reported outcome measures (PROMs), complications, and revisions. Statistical analysis was performed to compare cohorts for pre- and post-operative patient metrics using partially overlapping t-test.

**RESULTS:** 24 (3.4%) patients required revision surgery. 5 (0.71%) of these were due to patellar component complications: 1 (0.14%) for aseptic patellar loosening and 4 (0.57%) for polyethylene dissociation from the metal-backing. There were 19 (2.7%) non-patellar related revisions: 4 (0.57%) for tibial component aseptic loosening, 1 (0.14%) for femoral component aseptic loosening, 9 (1.3%) for prosthetic joint infection, 1 (0.14%) for popliteus impingement, and 4 (0.57%) for instability. Pre-operative Knee Score was 45.6 versus 91.1 post-operatively (p<0.001). Pre-operative Knee Functional Score was 45.7 versus 84.4 post-operatively (p<0.001). Survivorship of the metal-backed patellar component for all-cause failure was 97.5% at 12-years.

**DISCUSSION:** Cementless TKA utilizing 2<sup>nd</sup> generation metal-backed patellar components with a modern design implant demonstrated a 97.5% all-cause survivorship at 12-years. Polyethylene dissociation from the metal-backing was the most common cause of patellar component failure. Limitations of the study include inherent flaws in retrospective reviews and indications for the use of cementless implants was biased towards more obese, younger, and active individuals. Advances in implant design and polyethylene wear properties have led to improved clinical results with cementless metal-backed patellar components. Given the increasing use of cementless TKA implants with metal-backed patellar components over the past decade, this study shows encouraging results with improved survivorship at mean 7-year follow-up compared to initial design metal-backed implants.

**SIGNIFICANCE/CLINICAL RELEVANCE:** 1<sup>st</sup> generation cementless metal-backed patellar components had high failure rates leading to their abandonment, but there has been a resurgence of cementless TKA implants. Given younger, more active, and obese patients opting for TKA, it is significant to understand the long-term survivorship of 2<sup>nd</sup> generation cementless patellar components as improvements have been made with design modifications and polyethylene wear properties.

## IMAGES AND TABLES:

Figure 1: Kaplan-Meier survivorship curve with a 95% confidence interval demonstrating 99.9% survivorship of metal-backed patella with aseptic loosening as the endpoint and 97.5% survivorship with all-cause failure as the endpoint at 12-years.

