Radiographic and Clinical Comparisons of a Modern Symmetrical versus Assymetrical Implant Design in Primary Total Knee Arthroplasty

Joshua Rainey, Brenna Blackburn[1], Claire R Kapron, Michael J Archibeck, Christopher Earl Pelt[1]
[1]University of Utah

INTRODUCTION: While an asymmetrical, left/right specific, femoral and tibial component is commonly used in modern TKA, the recent introduction of an updated symmetrical, left/right non-specific, design may afford some benefits due to reduced implant and instrumentation requirements. Given the left/right non-specific anterior trochlear design, some concerns over patellar tracking may exist with a symmetrical design. The purpose of this study was to compare clinical outcomes and radiographic analysis of patellar tracking of the symmetrical TKA design compared to a more commonly used implant with an asymmetrical femoral component.

METHODS: 225 patients (246 knees) who underwent TKA at an academic center with an implant featuring a symmetrical tibial and femoral component, which features a double 9° Q-angle trochlear design instead of left/right specific trochleae, were compared to a matched historical cohort of 235 patients (237 knees) with asymmetric femoral components. All surgeries were performed by the senior author using a similar posterior referenced, measured resection technique. Patient demographics, patient-reported outcomes (PROs), complications, knee range of motion (ROM), and radiographic analysis, performed by an independent observer, including patellar tilt and displacement were assessed. Chi-squared and t-tests were used.

RESULTS: There were no significant demographic differences between groups. There were no differences in PROs, failures, or complications at one year ($p>0.05$). Radiographic patellar tracking was similar between groups with the exception of the symmetrical TKA demonstrating significantly less patellar tilt (0.5° versus 3.1°, $P<0.0001$). There was no significant difference in pre-operative or postoperative ROM between the groups ($p=0.4884$ and $p=0.2445$).

DISCUSSION AND CONCLUSION: The symmetrical femoral design demonstrated similar PROs and outcomes to an asymmetrical TKA implant. Of interest, despite some concern that patellar tracking could be worse in a symmetrical implant, instead there were significantly fewer patellar maltracking outliers, particularly with regard to lateral tilt. These findings, along with the potential value and efficiency of the reduced inventory, may lend support to the use of a modern symmetrical TKA.