

Functional Gain and Pain Improvement After Primary Total Knee Replacement Are Influenced by Patient Characteristics and Not Implant Manufacturer

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Introduction: Implant selection is largely based on institutional factors, surgeon training, and preference. International registries compare relative revision rates by implant but do not assess functional outcomes. We sought to quantify and compare functional outcomes by implant manufacturer. We compared pre-post primary total knee replacement (TKR) pain improvement and functional gain at 12 months in a contemporary multi-site patient cohort to determine if patient-reported gains differ among implant manufacturers.

Methods: 9,818 patients (mean age=65.8 years, 65% females) received implants by Stryker, Zimmer Biomet, Smith & Nephew or DePuy. Preoperative demographics including medical (modified Charlson), musculoskeletal, and emotional (SF; MCS) comorbidity data were collected and merged with pre- and post-TKR pain and function (KOOS pain and ADL) scores from each patient. Descriptive statistics, kernel density curves, and multivariable linear models, adjusted for variation within site, were performed. Statistical significance was set at $p < 0.05$.

Results: Manufacturer A, B, C and D implants were used in 5,658, 2,202, 1,283, and 675 patients respectively. The majority reported excellent pain relief and functional gains across implants. Across implant manufacturers, pre-post improvements in KOOS knee pain scores were comparable (A=35.6, B=35.8, C=35.9, D=34.3). Similar improvements were seen in KOOS ADL scores across all implants (A=30.9, B=30.5, C=30.2, D=28.3). In multivariable models adjusting for patient covariates, implant manufacturer was not significantly associated with postoperative pain or function. However, patient factors (older age, non-white race, smoker, low back pain, pain in non-operative hips/knees, low MCS) are associated with significantly ($p < 0.05$) poorer gains in pain and function.

Conclusions: Multiple different implants are used for primary TKR. No differences in postoperative pain improvement or functional gain at 12 months were seen between implant manufacturers. However, patient factors continue to significantly influence gains in postoperative pain and function.