Have Modern Total Knee Arthroplasty Implant Improvements Affected Revision Rates: Registry Review of Modern Implants and their Predecessors

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INTRODUCTION: Total knee arthroplasty (TKA) is a common orthopedic procedure used to alleviate pain and restore mobility in patients with knee pain. Substantial resources are committed to updating and refining new knee implant designs to improve outcomes. The aim of this study was to compare revision rates and failure modes between newer implants and their older counterparts.

METHODS: FDA 510 (k) pre-market submissions were reviewed to identify predecessor and successor implant designs. A systematic literature review of national registries was then conducted to identify individual implant revision data and entries across multiple registries for comparison purposes. Reported revision rates of TKA implant designs were analyzed in addition to implant type and method of fixation when available. Additionally, TKA revision indications were collected and compared between registries.

RESULTS: Our primary finding was no difference in revision rates between newer implant designs and their older counterparts at any recorded time point between 1 and 15 years. A meta-analysis compared the indication percentages for infection, loosening, mechanical complication, instability, pain, wear, fracture, and stiffness and showed significant differences between registries (P=<0.001).

DISCUSSION AND CONCLUSION: The findings of this study show no significant advantage to developing a new implant design when evaluating revision rate and indication. Given the need for value-based care, other parameters, such as patient satisfaction and functional outcomes, should be required to demonstrate the value of a new implant compared to the development cost.