Robotic Assistance Improves Success of Cementless Component Fixation in One Total Knee Arthroplasty System

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INTRODUCTION:
New cementless implant designs in total knee arthroplasty (TKA) have begun to shift the longstanding practice of cemented fixation. With aseptic loosening a leading cause for revision of cementless implants, initial osteointegration is critical for component survivorship. Robotic-assisted TKA (RA-TKA) has shown promising results in recent literature at improving component accuracy. The current study aims to evaluate if RA-TKA affects the rate of aseptic loosening of cementless components.
METHODS:
All cementless primary TKA components from one manufacturer implanted by five surgeons between June 2018 and October 2022 with minimum one-year follow-up were retrospectively reviewed. Femoral and tibial components were reviewed separately and grouped based on whether manual or RA-TKA was performed. A Chi-Squared test was used to analyze if aseptic loosening rates were different between the two techniques.
RESULTS:
319 cementless components from a single knee system were included. 123 femoral and 92 tibial components were implanted using RA-TKA, while 50 femoral and 54 tibial components were implanted manually. At a mean follow-up of 18.7 months (range, 12 to 48 months), successful fixation was achieved in 97.8% of all components. No femoral components from either group were revised due to aseptic loosening. Four manually implanted vs. no robotically assisted tibial components were revised due to aseptic loosening (7.4% vs 0.0%; $X^2 = 6.86$; df = 1; $P = 0.009$).
DISCUSSION AND CONCLUSION:
The performance of modern cementless femoral components was excellent with or without robotic assistance, however the survivorship of the same system's cementless tibial component was improved with RA-TKA.