

Sagittal Plane Alignment in Primary Total Knee Arthroplasty Using Robotics

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INTRODUCTION:

Robotic-assisted total knee arthroplasty (TKA) is an increasingly utilized means of performing TKA and has been shown to help facilitate the accuracy and precision of making bone cuts and hitting target alignment goals. However, most of the literature is focused on overall mechanical alignment in the coronal plane.

METHODS:

Data from 113 primary TKAs performed at Methodist were retrospectively reviewed. The pre-operative bone resection plans from 44 MAKO (Stryker, Mahwah, NJ, USA) robotic TKAs and 69 ROSA (Zimmer-Biomet, Warsaw, IN, USA) robotic TKAs performed by two fellowship-trained arthroplasty surgeons, experienced on each respective platform. Post-operative radiographs at first clinic follow-up were reviewed by two separate blinded orthopedic surgeons who measured femoral flexion and tibial slope and these were compared to the respective pre-operative plans.

RESULTS:

For MAKO TKAs, there was an average difference of $1.4 \pm 1.1^\circ$ between planned and measured tibial slopes with 90.9% of cases having $<3^\circ$ difference between planned and measured tibial slope angles. For femoral flexion, there was an average of $1.6 \pm 1.1^\circ$ of difference between planned and measured angles with 86.4% having $<3^\circ$ of difference between planned and measured angles.

For ROSA TKAs, there was an average difference of $2.4 \pm 1.6^\circ$ between planned and measured tibial slopes with 65.2% of cases having $<3^\circ$ of difference of between planned and measured tibial slopes. For femoral flexion, there was an average of $1.9 \pm 1.5^\circ$ of difference between planned and measured angles with 84.1% having $<3^\circ$ of difference between planned and measured angles.

DISCUSSION AND CONCLUSION:

Regarding sagittal plane resection goals, the use of robotic platforms for TKA allowed for accurate and precise execution of pre-operative plans, though the clinical relevance of this added accuracy and precision is not yet fully understood. Future studies are needed to further elucidate this importance.