

## Paper #162

# No Difference in Five-Year Clinical and Radiographic Outcomes between Kinematic and Mechanical Alignment in TKA: A Randomized Controlled Clinical Trial

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### Summary:

We found no significant difference in functional or radiographic outcomes between TKAs implanted with Mechanical or Kinematic Alignment at 5 years.

### Abstract:

## Introduction

Kinematic Alignment (KA) technique in total knee arthroplasty (TKA) attempts to match implant position to the pre-arthritic anatomy of an individual patient, with the goal of improving functional outcomes. This contrasts with a traditional neutral mechanical alignment (MA) goal, and the effect of these changes on implant survivorship remains unknown. This study compares the mid-term survivorship and functional outcomes between these two techniques, including radiographic assessment for signs of implant loosening/failure.

## Methods

Following a pilot study and power analysis, ninety-nine patients undergoing primary TKA for osteoarthritis were randomized to either MA (n=50) or KA (n=49) groups. All patients underwent pre-operative alignment assessment using full-length MRI scans. Computer Navigation was used for all patients in the MA group, and in the KA group patient specific cutting-blocks were manufactured using the individual pre-op MRI data. Alignment was assessed with post-operative CT scans in all patients, and radiographs obtained post operatively, and at 1, 2, and 5 years. Functional outcome scores were assessed pre-operatively and at 6 weeks, 6 months, 1, 2 and 5 years post-operatively. Standard short-leg radiographs were assessed using the Modern Knee Society Radiographic Evaluation System.

## Results

There was no significant difference in patient reported outcome measures (PROMs) at five years. The difference between the means (MA vs KA) were – Oxford Knee Score  $0.42 \pm 9.74$  ( $p=0.77$ ), Western Ontario and McMaster Universities (WOMAC) score  $3.57 \pm 3.12$  ( $p=0.32$ ), Forgotten Joint score  $6.08 \pm 5.39$  ( $p=0.26$ ), EQ-5D  $0.05 \pm 0.28$  ( $p=0.25$ ), and Knee Society Pain/Motion  $1.44 \pm 2.43$  ( $p=0.55$ ) or Function scores  $5.13 \pm 3.65$  ( $p=0.16$ ), Range of Motion  $-1.80 \pm 1.7$  ( $p=0.29$ ), Visual Analogue Score (VAS) Rest  $-0.30 \pm 1.99$  ( $p=0.32$ ) and VAS Mobilisation  $-0.11 \pm 2.40$  ( $p=0.76$ ). There were no significant differences in the presence of static or progressive radiolucent lines between MA and KA groups. There were no differences in the number of re-operations. The MA group had two revisions for infection and

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one secondary patella resurfacing with medial retinacular reconstruction following a fall. The KA group had one liner exchange for stiffness and one liner change plus secondary patellar resurfacing for on-going pain and swelling.

### Conclusions

We found no significant difference in functional or radiographic outcomes between TKAs implanted with MA or KA. The revision and re-operation rates were similar and at five years there were no significant differences in radiographic signs of loosening. These mid-term results support the two-year findings of no difference in MA vs KA, however the impact on long term survivorship is still unknown.