

Paper #1

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

Methods: Ninety-nine patients undergoing primary TKA for osteoarthritis were randomized to either MA (n=50) or KA (n=49) groups. Computer Navigation was used for all patients in the MA group, and in the KA group patient specific cutting-blocks were manufactured using individual preoperative MRI data. Radiographs were obtained postoperatively, and at 1, 2, and 5 years. Functional outcome scores were assessed preoperatively and at 6 weeks, 6 months, 1, 2 and 5 years postoperatively. 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 ± 9.74 ($p=0.77$), WOMAC score 3.57 ± 3.12 ($p=0.32$), Forgotten Joint Score 6.08 ± 5.39 ($p=0.26$), EQ-5D 0.05 ± 0.28 ($p=0.25$), Knee Society Pain/Motion 1.44 ± 2.43 ($p=0.55$) or Function Scores 5.13 ± 3.65 ($p=0.16$), and Range of Motion -1.80 ± 1.7 ($p=0.29$). There were no significant differences in the presence of static or progressive radiolucent lines. There were no differences in the number of re-operations. The MA group had two revisions for infection and one secondary patella resurfacing. The KA group had one liner exchange for stiffness and one liner exchange plus secondary patellar resurfacing for on-going pain.

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. 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.