Paper #6

Does Computer Navigation Improve Functional Outcomes after Total Knee Replacement?

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Introduction: Computer navigation in total knee replacement improves accuracy in component positioning and limb alignment in total knee arthroplasty (TKA). In addition, a recent meta-analysis of level 1 randomised trials found significantly better functional outcomes in TKAs performed with computer navigation compared to TKAs performed with conventional instruments. The aim of this study was to use a large national database to test the hypothesis that computer navigation improves functional outcome following TKA.

Methods: We analysed 9054 primary TKA procedures performed between 2006-2012 from the New Zealand National Joint Registry performed for a diagnosis of osteoarthritis using a single, modern design TKA implant. Of these, 3329 TKAs were implanted using computer navigation and 5725 using conventional instruments. Functional outcomes were compared using oxford knee score questionnaires sent at 6 months and 5 years post operatively. The effect of surgical duration on functional outcome and revision rates was analysed using a multivariate model adjusted for surgeon experience, age, sex, comorbidities, patella resurfacing, cementation, approach, implant type (cruciate retaining or posterior stabilised), theatre ventilation, bearing type and hospital (public versus private).

Results: On univariate analysis the mean 6 month oxford score was higher in the navigation group versus the conventional group (39.0 vs 38.1, p=0.006), however on multivariate analysis this difference was not statistically significant (p=0.54). There was no difference in mean oxford scores at 5 years between groups (42.2 vs 42.0, p=0.76). Lower oxford scores were seen in lower volume surgeons compared to higher volume surgeons, but the use of navigation did not improve functional outcome in either high or low volume surgeons (Figure 1.) At current follow up, there was no difference in revision rates between navigated and non-navigated TKA (0.46 vs 0.43 revisions per 100 component years, p=0.8, Figure 2).

Conclusion: In this comprehensive analysis of 9054 TKA procedures the use of computer navigation did not improve functional outcomes following TKA. At current follow up, any benefit to implant durability from improved component alignment with navigation is yet to be demonstrated.