



KNEE STIFFNESS FOLLOWING TOTAL KNEE ARTHROPLASTY: COMPARISON OF COMPUTER ASSISTED SURGERY AND CONVENTIONAL TECHNIQUE

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Computer assisted surgery techniques have yet to demonstrate any significant functional benefit over conventional methods in total knee arthroplasty. Outcome measures studied to-date are often subjective relying on patient interpretation and scoring, especially of the term 'stiffness'. However, this can be measured objectively as Nm/degree of joint rotation.

We used a novel purpose-built knee dynamometer (PBKD) to measure absolute end of range stiffness in a randomly selected sample of patients from a prospective, randomised trial of computer assisted (n=24) versus conventional (n=22) total knee arthroplasty. Implant position from postoperative computed-tomography scanning along with maximum moment of the quadriceps and hamstrings at 90° were analysed to detect any correlation with absolute knee stiffness.

Mean stiffness while extending from 100°-90° was 0.51±0.28Nm/deg for computer assisted and 0.52±0.2Nm/deg for conventional arthroplasty. Flexing from 90°-100°, mean stiffness was 0.64±0.25Nm/deg and 0.68±0.17Nm/deg respectively. Across the entire cohort of patients, correlation coefficient was calculated to quantify relationship between stiffness (extending and flexing) and implant position: tibial sagittal alignment (extending -0.43, flexing 0.48, see figure), tibia coronal alignment (0.34, 0.38), femorotibial component alignment match (0.34, 0.32), mechanical femorotibial alignment (0.34,

0.32), maximum quadriceps moment at 90° knee flexion (0.2, 0.41), and maximum hamstring moment at 90° knee flexion (0.16, 0.33).

No significant difference in postoperative knee stiffness following computer assisted and conventional arthroplasty carried out by a surgeon specializing in knee reconstruction can be detected using this methodology. Implant position may be a causal factor in knee stiffness following arthroplasty, which may limit rehabilitation and functional capacity.

250 words

Word limit 250

Figure: Graph displaying tibial sagittal alignment (°) against knee stiffness (Nm/deg) whilst flexing from 90° -100°. With increased slope of the tibial component from a neutral position (90° sagittal alignment), stiffness of the knee decreases.

