**Title:** Cementless Total Knee Replacements: Does surgical technique impact implant migration?

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**Structured Abstract:**

Introduction: A total knee replacement (TKR) is the standard of care treatment for end-stage osteoarthritis (OA) of the knee. Historically, bone cement (a grout-like substance) has been used to establish fixation between the implanted prosthesis and bone, providing two possible interfaces where component loosening may occur. An increasingly younger cohort requiring TKR’s alongside advances in prosthetic design and instrumentation bring attention to the issue of cement durability. Cementless implant systems are press fit implants coated with an osteo-conductive component surface which relies on bone ingrowth for fixation and offers a promising alternative. It is not currently known whether the surgical technique used to implant the prostheses will affect the longevity of cementless implants. Two different techniques are commonly used by surgeons and may result in different load transfer across the joint, which will affect bone ingrowth. The overall objective of the study is to assess implant migration and function after cementless TKR. The objective of this presentation is to examine migration in the early post-operative period.

Methods: Thirty-nine patients undergoing a unilateral TKR due to OA were recruited prior to surgery and randomized to a surgical technique based on referral. In gap balancing (GB) soft tissues are released from bone first to restore limb alignment followed by bone cuts (resection) to balance the joint space in flexion and extension. In measured resection (MR) bone cuts are made based on pre-determined anatomical landmarks followed by soft tissue releases with implant components in-situ. Patients returned 2 weeks, 6 weeks, 12 weeks, and 24 weeks following surgery for radiographic evaluation, the Timed-Up-and-Go (TUG) functional performance assessment, and to complete a series of questionnaires.

Results: There were no significant differences between the groups at baseline in terms of age, sex, body mass index, operative limb or any patient reported outcome measure. Pre-operatively there was no significant difference in total time to complete the TUG test (p=0.27), or any other temporal or flexion metrics (p>0.05). Regardless of technique, all of these temporal and flexion metrics improved over the follow up period (p<0.0001). On average implant migration at 24 weeks in the lateral-medial, superior-inferior, anterior-posterior axes of the tibial component were -0.022 ± 0.30 mm, -0.036 ± 0.23 mm, and -0.023 ± 0.36 mm and the femoral component were 0.05 ± 0.30 mm, 0.09 ± 0.09 mm, and 0.05 ± 0.43 mm.

Discussion: The inclusion of functional performance assessment has provided a new perspective to functional restoration. No differences in migratory patterns were observed in the early post-operative period between the surgical techniques. Once patients complete the 6 month follow-up we will be able to compare the measured migration to established migration thresholds which can predict long-term implant failure.