

## Do Patients Feel the Difference; Relationship with Patella Femoral Kinematics and Patient Reported Outcome Measures After Total Knee Arthroplasty

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### Summary:

This research assesses the relationship between patella femoral joint kinematics and patient reported outcome measures after total knee arthroplasty.

### Abstract:

**INTRODUCTION:** Total knee arthroplasty (TKA) is an established procedure for reducing knee pain and restoring function for patients with osteoarthritis (OA). However, a percentage of patients report ongoing anterior knee pain following TKA. Post-operative patello-femoral kinematics can contribute to the overall stability of the knee joint, and can subsequently influence patient satisfaction and quality of life. The relationship between post-operative patellafemoral kinematics and patient reported outcomes is not clearly defined.

**METHODS:** A dynamic knee simulation (DKS) replicating the Oxford Knee Rig was used to examine lateral patella displacement, lateral patella tilt and patella flexion about a global reference frame in 50 knees. Pre- and post-operative CT scans were segmented, landmarked and exported for the DKS. Lateral displacement was measured by the medio-lateral translation of the anterior apex landmark. Patella tilt was measured by the rotation of the line between the quadriceps insertion and patella tendon origin about the superior-inferior axis. Patella flexion was measured by the rotation of the line between the medial and lateral patellar edges about the medio-lateral axis. Post-operative Knee Injury and Osteoarthritis Outcome Score (KOOS) were measured at least 12 months post-operatively. Linear regressions and Spearman's Rho coefficients were determined, allowing the correlations between the specific aforementioned patellar kinematic motions and sub-sections of KOOS.

**RESULTS:** Correlations for patella-femoral kinematics and post-operative patient outcomes as measured by KOOS were observed. Increases in patella tilt at full flexion had statistically significant negative correlation to post-operative KOOS Symptoms ( $P = 0.001$ ). Additionally, the magnitude of lateral patella displacement between full flexion and full extension had statistically significant negative correlation to post-operative KOOS Pain ( $P = 0.003$ ).

**DISCUSSION:** Variability existed in both KOOS and patella-femoral kinematics. KOOS contain variation due to the patient self-reporting, and patients' patella-femoral kinematics contain variation due to the population group. Even so, it was observed that there was a population trend of an increase in patella tilt and lateral shift, and decrease in post-operative patient satisfaction. Reduction of both patella tilt and lateral shift through medialisation of the patella button allows for control of these factors for improved patella tracking and consequently has the potential to impact patient reported TKA outcomes.

**Conclusion:** The study showed that there were correlations for a group of 50 patients between patello-femoral joint

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kinematics determined during dynamic knee simulation based on the Oxford Knee Rig using post-operative CT and 12 months post-operative KOOS sub-scores of Pain and Symptoms.