

00197 Predicting Individual Knee Range-of-motion, Knee Pain, and Walking Limitation Outcomes Following Total Knee Arthroplasty

Poon Lian Li Cheryl¹, Seah Jie Ting Felicia², Pua Yong Hao¹, Julian Thumboo¹, Yeo Seng Jin¹, Tan Mann Hong¹, Ross Clark³, Chong Hwei Chi¹, Tan Wei Ming John¹, Chew Shuxian Eleanor¹

¹Singapore General Hospital, ²Sengkang General Hospital, ³University of Sunshine Coast

Aims: Previous studies have indicated that 11-20% of patients reported dissatisfaction following total knee arthroplasty (TKA), and that patient dissatisfaction was associated with persistent knee range limitations, knee pain, and functional limitations. Thus, early identification of patients at risk for poor post-TKA outcomes would better direct resources toward preventive care for them. Our study aimed to develop a prediction model for 6-month knee range-of-motion, knee pain, and walking limitations in patients undergoing TKA.

Methodology: We performed a prospective cohort study of 4026 patients who underwent primary TKA between July-2013 and July-2017. Candidate predictors included demographic, clinical, psychosocial, and preoperative outcome measures. The outcomes-of-interest were (i) knee extension and flexion range-of-motion measured using goniometry, (ii) knee pain rated on a 5-point ordinal scale, and (iii) self-reported maximum walk time at 6 months post TKA. For each outcome, we fitted a multivariable proportional odds regression model with bootstrap internal validation.

Result: At 6 months post TKA, 5-20% of patients had a knee flexion contracture $\geq 10^\circ$, knee flexion range-of-motion $< 90^\circ$, moderate-to-severe knee pain, or a maximum walk time ≤ 15 minutes. Each postoperative outcome was strongly influenced by the same outcome measure obtained preoperatively (P 's < 0.001). Additional strong predictors were age, sex, race, education level, diabetes mellitus, preoperative use of gait aids, contralateral knee pain, and psychological distress (P 's < 0.001). The generalized optimism-corrected c-indices for predicting knee extension range-of-motion, flexion range-of-motion, knee pain, and walking limitations were 0.65, 0.71, 0.58, and 0.70, respectively. We created a web application (<https://sgh-physio.shinyapps.io/predicTKR/>) to show the expected distributions of the TKA outcomes for individual patients based on their preoperative demographic and clinical characteristics.

Conclusion: We have developed prediction models to predict, for individual patients, their likely post-TKA levels of knee range-of-motion, knee pain, and walking limitations. Potentially, they can be used preoperatively to identify at-risk patients and to help patients set more realistic expectations about surgical outcomes.