

Range of Motion Trajectories after Revision Total Knee Arthroplasty for Stiffness: Early Motion Matters

Jonggu Shin¹, Daniel A Driscoll¹, Himani Kolli¹, Allina A Nocon¹, David Mayman¹, Peter Sculco¹, Thomas Sculco¹

¹Hospital for Special Surgery, Stavros Niarchos Foundation Complex Joint Reconstruction, New York, NY

Email of Presenting Author: shinjo@hss.edu

Disclosures: J. Shin: None. D. Driscoll: None. H. Kolli: None. A. Nocon: None. D. Mayman: 1; Ortho AI. 3B; Stryker. 4; ORTHALIGN INC, CyMedica Orthopedics, Inc., MiCare Path, Imagen Technology Inc, WishBone Medical Inc. P. Sculco: 1; Enovis. 2; Zimmer. 3B; Enovis, Zimmer. 4; Intellijoint Surgical, Parvizi Surgical Innovation. 5; Intellijoint Surgical. T. Sculco: 1; Exactech, Inc. 3C; Lima Orthopedic. 8; American Journal of Orthopedics. 9; J. Robert Gladden Society, Orthopaedic Research and Education Foundation.

INTRODUCTION: Stiffness after primary total knee arthroplasty (TKA) is a challenging complication with revision TKA (rTKA) is occasionally necessary for recurrent severe stiffness. At present, the expected trajectory in range of motion (ROM) for rTKA stiffness is not clearly defined. The objective of this study was thus (1) to report the range of motion trajectory for stiff patients post revision TKA (2) to identify a potential ROM threshold associated with ROM outcomes and (3) to describe patterns in regression based on this established threshold.

METHODS: The study was approved by the IRB. 41 patients were included in the study and 32 were females. Patients scheduled for revision TKA due to stiffness, defined as having a baseline flexion < 100°. Sequential range of motion assessments were completed at preoperative, 6 weeks, 6 months, and one year postoperatively. ROM was evaluated using a goniometer by three independent readers. Agreement between readers was strong (ICC>0.70). For patients who could not return for follow-up, ROM was evaluated using a standardized photo. An 84° threshold was defined using the mean ROM at 6 weeks, and corresponding sensitivity analyses were used to determine appropriateness of the cut off. Descriptive statistics was used to determine means of ROM and frequency of regression based on the defined threshold.

RESULTS SECTION: Overall 41 patients were included in analysis. Mean age was 67 (±6.8), mean BMI was 31 (±20.5) and majority were female (78%). Mean preoperative ROM was 58° (±25), 84.3° (±22) at 6 weeks, 88° (±20.4) at 6 months, and 92° (±25.8) at 1 year. Overall mean gain from baseline was 34.4°. Of those who have met the 84° threshold, 19 (46%) presented at 6 months as a regression from their 6 weeks. At postoperative 1 year, only 2 (4.9%) regressed from their baseline ROM. Our sensitivity analysis showed when the cutoffs were set below 84° (80° and 75°), more patients were found to regress from baseline (12% (n=5) in 80° and 15% (n=6) in 75°).

DISCUSSION: Though stiff patients showed regression in between post operative time points, patients who achieved 84° at 6 weeks ultimately had better ROM outcomes. Larger studies are needed to validate the 84° cutoff, and additional studies are needed with respect to patient education and setting expectations as it relates to meeting clinically appropriate ROM during the recovery period.

SIGNIFICANCE/CLINICAL RELEVANCE: (1-2 sentences): Patients who had reached greater or equal to 84° ROM in their post-operative 6 weeks are projected to at least remain at consistent ROM in their recovery course for over a year. ROM trajectory for revision TAK can provide insight to both patients and surgeons in their recovery journey and lead to improved patient education and their involvement in rehabilitation.

ACKNOWLEDGEMENTS: This study was funded through the generosity of the Anna-Maria and Stephen Kellen Foundation and Marina Kellen French.

Figure 1a & b: ROM of stiff patient throughout full episode of care (a = those who achieve 84 degrees at 6wks, b = patients who did not)

