

Contemporary Revision Total Knee Arthroplasty Continues to have Higher Complication Rates After Instability or Arthrofibrosis

Randall Bissette, B.S.¹, Mark W. Schmitt, M.D., M.S.², Linsen T. Samuel, M.D., M.B.A.², Devon Pekas, M.D., M.S.², Joseph T. Moskal, M.D.^{1,2}, Murillo Adrados, M.D.^{1,2}

¹Department of Orthopaedic Surgery, Virginia Tech Carilion School of Medicine, Roanoke, VA, ²Department of Orthopaedic Surgery, Institute for Orthopaedics & Neurosciences, Carilion Clinic, Roanoke, VA
rbissette@carilionclinic.org

Disclosures: Randall Bissette (N), Mark W. Schmitt (N), Linsen T. Samuel (N), Devon Pekas (N), Joseph T. Moskal (N), Murillo Adrados (N)

INTRODUCTION: Revision total knee arthroplasty (TKA) has been associated with exceptional postoperative outcomes when performed for aseptic loosening. However, when performed for instability, revision TKA has historically failed to meet patient's expectations, with poor satisfaction scores reported in most published series. This may result from lack of a diagnostic standard, variable treatment strategies, early generation implants, and lack of a consistent etiology for the treated instability. We report our center's recent experience with revision TKA for instability and arthrofibrosis compared to a similar cohort treated for aseptic loosening using modern implants. We hypothesize that patients who undergo revision TKA for instability experience greater complication rates and have lower overall satisfaction than those who undergo revision for aseptic loosening.

METHODS: We retrospectively reviewed all patients in an institutional electronic health record database from a single tertiary referral center who underwent revision TKA (Current Procedural Terminology codes 27486 & 27487) between November 1st, 2010 and September 5th, 2022. Exclusion criteria were revision TKA indications of infection or fracture. Primary outcome measures collected were postoperative 90-day return to OR for same-knee related issues; secondary outcomes collected were operative complexity (defined as use of augments & stemmed implant), postoperative 90-day emergency department (ED) visits, postoperative 90-day readmissions, and postoperative Knee Injury and Osteoarthritis Outcome Score (KOOS)-JR patient reported outcome measure scores. Two-tailed analysis was used to confirm demographic similarity between experimental groups. Fischer's exact *p* test was used to compare 90-day outcomes and operative complexity. Two-tailed analysis was used to compare satisfaction scores.

RESULTS SECTION: 94 revision TKA procedures performed for instability or a spectrum of arthrofibrosis and 177 revision TKA procedures performed for aseptic loosening were identified and categorized into two cohorts. Two-tailed analysis revealed no differences in demographics between the cohorts when analyzed for age, gender, and ASA status ($p < 0.05$). Ninety-day postoperative return to OR was greater after instability or arthrofibrosis compared to aseptic loosening (7 versus 2%; $p = 0.036$) (Table 1). Ninety-day ED visits were not statistically different (9 versus 12%; $p = 0.54$) (Table 1). Ninety-day readmissions were not statistically different (10 versus 5%; $p = 0.12$) (Table 1). Revision TKA for aseptic loosening required a greater number of augments and stemmed implants (83 versus 52%, $p < 0.05$) (Table 1) when compared to revision TKA for instability or arthrofibrosis. Post-operative KOOS-JR scores were not statistically different (62.69 versus 54.29; 95% CI [-1.05, 17.85]; $p = 0.08$) between cohorts.

DISCUSSION: Although revision TKA for aseptic loosening often involves greater operative complexity, patients undergoing revision TKA for instability or arthrofibrosis have a higher 90-day complication rate. Instability is not always an objective assessment, and variable treatment approaches have led to underperforming outcomes when compared to similar cohorts who undergo revision TKA for aseptic loosening. These results underscore the need for further probing to uncover the actual mechanisms underlying failed TKA revision due to instability and arthrofibrosis. In addition to the underlying deficiency in treatment approaches for instability after TKA, there may be patient-specific factors that predispose to poor outcomes following revision for instability. An immediate follow-up study will involve pre- and post-operative radiographic investigation of X-rays for patients who underwent revision TKA for instability or aseptic loosening to unveil anatomic parameters that contribute to outcomes following revision.

SIGNIFICANCE/CLINICAL RELEVANCE: Modern implants and techniques have not improved the historically poor results of revision TKA for instability or arthrofibrosis. Results of this study point towards the need for development of better operative implants and techniques for revision total knee arthroplasty for instability or arthrofibrosis.

Table 1.

	Aseptic Loosening	Instability	Fischer's exact <i>p</i>
Total patients	177	94	
Acute (90 days) Post-operative Outcomes			
Return to OR (count)	3	7	0.036
Return to OR (rate)	0.02	0.07	
Return to ED (count)	21	8	0.536
Return to ED (rate)	0.12	0.09	
Readmission (count)	8	9	0.118
Readmission (rate)	0.05	0.10	
Augments & Stemmed Implants			
Augments/stems (count)	147	48	<0.05
Augments/stems (rate)	0.83	0.51	