

Is Younger Age a Risk Factor for Failure following Aseptic Revision Total Knee Arthroplasty?

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INTRODUCTION:

Revision total knee arthroplasties (rTKAs) are being performed more frequently in the United States in younger patients. Few studies have evaluated the effect of age following rTKA. The study sought to evaluate the effect of age on rTKA outcomes.

METHODS:

The American Joint Replacement Registry (AJRR) was utilized to evaluate aseptic rTKAs in younger (18-55 years, n=11,463) and older (≥65 years, n=49,992) patients from January 2012-September 2020. All patients were followed through September 2022, allowing for minimum two-year follow up. The mean age was 49.4 years in the younger and 73.4 years in the older cohort. Gender and BMI were similar between groups. Kaplan-Meier survivorship analysis was performed with rerevision as the endpoint, and multivariate analyses were performed to adjust for demographics and comorbidities.

RESULTS:

Rate of rerevision was higher in the younger cohort compared to the older (9.3% vs. 5.3%, p<0.01). Ten-year survivorship free of all-cause rerevision was 89.9% (95%CI: 88-90%) in the younger vs. 94.1% (95%CI: 93-94%) in the older cohort. Ten-year point estimates for rerevision for infection were 3% vs. 1%, mechanical loosening 2% vs. 1%, instability 2% vs. 1% (p<0.01, younger vs. older patients). Younger age was associated with a higher adjusted hazard ratio for all-cause rerevision (HR: 1.6, 95%CI: 1.3-1.8), as were male sex (HR: 1.3, 95%CI: 1.2-1.5), and initial revision for instability (HR: 1.4, 95%CI: 1.1-1.6). Notably, a 5-year decrease in age was associated with a 10.5% increase in odds of rerevision. Indications for rerevisions differed among the younger and older cohorts (p<0.01): infection (28.3% vs. 34.9%), aseptic loosening (17.9% vs. 15.8%), and instability (13.6% vs. 12.7%).

DISCUSSION AND CONCLUSION:

Younger age, male sex, and initial revision performed for instability were associated with significantly increased risk for all-cause rerevision following aseptic rTKA. Future research may further elucidate these increased risks in this younger population.

Figure 1. Kaplan-Meier Curve for All-Cause Re-revision

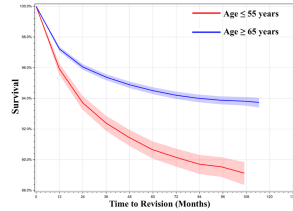


Table 1. Characteristics of Younger vs. Older Patients

	Age Group		Total	P Value
	18-55 years (n=11,463)	≥65 years (n=49,992)	(n=61,455)	
Age, years	48.4 ± 1.1	73.2 ± 2.4	68.4 ± 11.4	<0.001
Body Mass Index, kg/m ²	25.2 ± 5.8	25.2 ± 6.7	25.2 ± 7.1	<0.001
Charlson Comorbidity Index	0.3 ± 0.9	2.3 ± 1.3	2.8 ± 1.8	<0.001
Female, %	45.2%	45.0%	45.0%	0.48
Initial Revision Indication				
Mechanical Loosening	2,069 (18.1%)	13,820 (27.7%)	15,889 (25.7%)	
Other Mechanical Complications	2,468 (21.6%)	3,710 (7.4%)	6,178 (10.0%)	
All Other	2,286 (19.9%)	2,185 (4.4%)	4,471 (7.3%)	
Instability	1,051 (9.2%)	6,833 (13.7%)	7,884 (12.8%)	<0.001
Patellar	201 (1.8%)	1,072 (2.1%)	1,273 (2.1%)	
Patellofemoral	211 (1.8%)	1,561 (3.1%)	1,772 (2.9%)	
Stiffness	241 (2.1%)	581 (1.2%)	822 (1.3%)	
Instability or Other Complications	441 (3.8%)	381 (0.8%)	822 (1.3%)	

Table 2. Indications for Re-Revision TKA

	Age Group		Total	P Value
	18-55 years (n=11,463)	≥65 years (n=49,992)	(n=61,455)	
Re-Revision Indication				
Infection	791 (6.9%)	622 (1.2%)	1,413 (2.3%)	<0.001
Mechanical Loosening	502 (4.4%)	271 (0.5%)	773 (1.2%)	
All Other	2,072 (18.1%)	3,866 (7.7%)	5,938 (9.6%)	
Other Mechanical Complications	266 (2.3%)	244 (0.5%)	510 (0.8%)	
Instability	313 (2.7%)	389 (0.8%)	702 (1.1%)	
Patellar	57 (0.5%)	17 (0.0%)	74 (0.1%)	
Patellofemoral	25 (0.2%)	17 (0.0%)	42 (0.1%)	
Stiffness or Other Complications	26 (0.2%)	17 (0.0%)	43 (0.1%)	
Stiffness	46 (0.4%)	18 (0.0%)	64 (0.1%)	
Stem or Osseous	1 (0.0%)	16 (0.0%)	17 (0.0%)	

Table 3. Cause-Specific Cox Proportional Hazard Regression Models on Risk Factors for Re-Revision

Outcome	Hazard Ratio (95% CI)	HR (95% CI)	P Value
Age < 55 years (reference > 65 years)	1.62	1.39	<0.001
Age (per year increase)	1.02	1.02	<0.001
Female Sex (reference: Male Sex)	0.74	0.81	<0.001
Charlson Comorbidity Index	1.20	1.02	<0.001
Body Mass Index	1.01	1.01	0.8051
Revision Indication: Instability (reference: Mechanical Loosening)	1.31	1.14	0.0002