

EXAMINING THE RELATIONSHIP BETWEEN AGE AND POST-OPERATIVE RANGE OF MOTION IN PATIENTS AFTER TOTAL KNEE ARTHROPLASTY

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Introduction: Total knee arthroplasty (TKA) is an effective treatment for end-stage osteoarthritis. However, a subset of patients experience arthrofibrosis, characterized by excessive scar tissue and restricted range of motion (ROM). Early postoperative ROM, particularly at 6 weeks, is a key predictor of long-term stiffness. While older age is a well-known risk factor for osteoarthritis, younger patients may mount a more robust fibrotic response after TKA. This study investigated whether younger age is associated with decreased postoperative ROM following TKA.

Methods: We conducted a retrospective chart review of patients undergoing primary TKA at a single institution between 2023–2024. Inclusion required documented preoperative ROM and available follow-up at 6 weeks. Patients with revision TKA, incomplete records, or postoperative complications unrelated to arthrofibrosis were excluded. The final cohort included 49 patients. The descriptive statistics regarding this cohort is included in Table 1. Multivariable linear regression was performed to assess the relationship between age and 6-week postoperative ROM, with adjustment for sex, BMI, smoking, A1c, and inpatient stay duration.

Results: Among patients discharged after 1 inpatient day, younger age was significantly associated with reduced 6-week flexion ($\beta = -7.8^\circ$ (95% CI: -12.8, -2.7) per 10-year age decrease, $p < 0.05$). Patients younger than 65 had an average 16.3° (-24.7, -8.0) lower flexion at 6 weeks compared to those ≥ 65 . In contrast, among patients with >1 inpatient day, the association reversed, with younger patients showing greater flexion gains ($\beta = +7.9^\circ$ per 10-year age decrease, not statistically significant).

Discussion: These findings suggest that younger patients, particularly those discharged after a 1-day inpatient stay, may be at increased risk for postoperative stiffness. Extended hospitalization in this cohort reflected underlying medical comorbidities, which may influence recovery trajectories. Limitations include small sample size, single-institution design, and potential residual confounding. Future studies should evaluate tissue-level mechanisms and incorporate patient-reported outcomes.

Significance/Clinical Relevance: This study highlights the need for age-specific postoperative management strategies after TKA. Identifying younger patients at risk for arthrofibrosis may allow earlier interventions to optimize recovery trajectories and preserve function.

Figure 1: Association between age and 6-week postoperative knee flexion, stratified by inpatient stay duration.

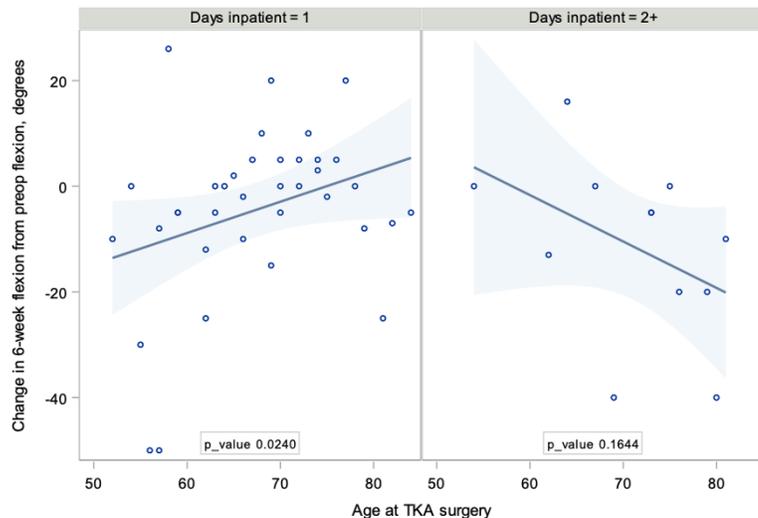


Table 1: Descriptive statistics for post-TKA study, N=49.

Characteristics	Overall
Male, n (%)	19 (38.8)
Age in years, mean \pm SD, range=52-84	68.4 \pm 8.5
Age <65, n (%)	17 (34.7)
BMI in kg/m ² , mean \pm SD, range=20.7-45.1	32.8 \pm 6.1
Former tobacco use, n (%)	22 (44.9)
A1c in %, mean \pm SD, range=5.0-7.5	5.57 \pm 0.52
Days inpatient, median [IQR], range=1-9	1 [1-1]
Days inpatient >1, n %	12 (24.5)
Flexion	
Pre-op flexion, mean \pm SD, range=90-130	118.4 \pm 10.0
6-week flexion, mean \pm SD, range=65-130	112.3 \pm 16.2
6-week change in flexion, mean \pm SD, range=-50-26	-6.1 \pm 16.2

SD=standard deviation; IQR=interquartile range