

A comparison of the periprosthetic fracture rate of unicompartmental and total knee replacements: An analysis of data of over 100,000 knee replacements from National Databases

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INTRODUCTION: Periprosthetic fractures are rare but devastating complication of knee replacement surgery, often requiring complex revision surgery. It is currently unknown how the fracture rates of total knee replacement (TKR) and unicompartmental knee replacements (UKR) compare. We performed the largest matched comparative study, with over 100,000 matched knee replacements comparing TKR and UKR fracture rates.

METHODS: 54,215 UKRs and 54,215 TKRs performed between January 2004 and December 2018 from the National Joint Registry (NJR) and Hospital Episodes Statistics database were propensity score matched on patient and surgical factors. The International Classification of Diseases Revision code M96.6 was used to identify periprosthetic fractures within 3 months and up to 10 years postoperatively. Subgroup analyses were performed in different age groups (<55 years, 55-64 years, 65-74 years, ≥75 years) and body mass index (BMI) categories (normal 18.5 to <25 kg/m², overweight 25 to <30 kg/m² and obese ≥30 kg/m²).

RESULTS:

The 3 month fracture rate in the UKR and TKR groups were 0.09% (n=50) and 0.05% (n=25) respectively with this difference being significant (p=0.004). After 3 months, fracture rates were 0.32% (n=171) and 0.61% (n=329) for UKR and TKR (p<0.001) respectively. In the different age groups the 3 month fracture rates were similar except in the 65-74 years group where the rates were higher for the UKR group (Table 1). Fracture rates after 3 months were all higher in the TKR group for all age groups (Table 1). In the different BMI groups there was no differences in 3 month fracture rates between TKR and UKR groups (Table 2). After 3 months fracture rates were significantly higher in the TKR group for all BMI groups (Table 2).

DISCUSSION AND CONCLUSION: UKR had a higher three month periprosthetic fracture risk but this difference was minimal (0.04% higher). Subgroup analyses showed higher fracture rates in the 65-74 years group for UKR but there were no differences in BMI subgroups. For fracture rates after three months TKR had slightly higher periprosthetic fracture rates (0.29% higher) and these differences remained on subgroup analyses of age and BMI.

Table 1. Comparison of periprosthetic fracture rate of TKR and UKR in different age groups. Rates were compared between groups using the chi-square test except when frequencies were below 5, in which case Fisher's exact test was utilized.

Age group	TKR	UKR	P value
Fracture rate within 3 months			
< 55	5 (0.06%)	6 (0.06%)	p=0.83
55-64	6 (0.03%)	7 (0.04%)	p=0.74
65-74	6 (0.03%)	20 (0.11%)	p=0.005
≥ 75	8 (0.10%)	17 (0.20%)	p=0.11
Fracture rate after 3 months			
< 55	46 (0.51%)	25 (0.27%)	p=0.007
55-64	89 (0.48%)	40 (0.22%)	p<0.001
65-74	117 (0.63%)	59 (0.32%)	p<0.001
≥ 75	77 (0.98%)	47 (0.55%)	p=0.002

Table 2. Comparison of periprosthetic fracture rate of TKR and UKR in different BMI groups. Rates were compared between groups using the chi-square test except when frequencies were below 5, in which case Fisher's exact test was utilized.

BMI group	TKR	UKR	P value
Fracture rate within 3 months			
Normal	4 (0.14%)	5 (0.13%)	p=0.95
Overweight	7 (0.06%)	13 (0.09%)	p=0.36
Obese	9 (0.04%)	17 (0.09%)	p=0.06
Fracture rate after 3 months			
Normal	29 (1.0%)	19 (0.5%)	p=0.02
Overweight	57 (0.5%)	31 (0.22%)	p<0.001
Obese	95 (0.43%)	52 (0.27%)	p=0.005