Amount of Fat Pad Resection Influences Postoperative Patella Baja and Persistent Pain after Total Knee Arthroplasty

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INTRODUCTION: Patella baja is defined as a low-lying patella and is a potential complication after total knee arthroplasty (TKA) that is associated with postoperative stiffness, pain, and reduced range of motion. The infrapatellar fat pad is deep to the patellar tendon, which has traditionally been resected during a TKA, allowing for enhanced visualization of the tibial plateau. However, there remains a lack of conclusive evidence regarding outcomes between the preservation or resection of the fat pad. In particular, the effect of fat pad resection on the risk of patella baja remains unclear. We hypothesize that a complete fat pad resection during TKA increases the incidence of postoperative patella baja while reducing the incidence of persistent pain.

METHODS: The primary outcome of this single-institution retrospective study was patellar baja in patients who underwent primary TKA from 2014 to 2025. A complete fat pad resection was defined as an exposed undersurface of the patellar tendon, and a selective fat pad resection was defined as an unexposed undersurface of the patellar tendon. New cases of patella baja were identified from lateral knee radiographs using the Insall-Salvati ratio. Secondary outcomes included Knee Society Score (KSS), persistent pain, and range of motion. Risk-adjusted multivariable regression was used to investigate the relative relationship between fat pad resection and the selected outcomes (two-sided α=0.05), with results presented as odds ratios (ORs) and 95% confidence intervals (CIs). The number needed to harm (NNH), i.e. the number of patients one would have to treat to encounter one additional adverse event, was also calculated.

RESULTS:

The final cohort included 647 patients (67-±10 years, 62.1% female) with complete (n=378) or partial (n=269) fat pad resection **(Table 1)**. Mean follow up duration was longer in the patrial fat pad resection group (2.6±2.3 years) when compared to the complete fat pad resection group (1.7±1.8 years, p<0.001). Complete fat pad resection was associated with a higher incidence of new postoperative patella baja (5.7% versus 2.1%, NNH: 28, p=0.037), lower median postoperative KSS scores (95 versus 98, p<0.001), a higher incidence of constant pain (9.5% versus 4.1%, NNH: 19, p=0.013), and reduced range of motion (115° versus 120°, p=0.007). After multivariable risk adjustment, complete fat pad resection was associated with a nearly threefold increased odds of new patella baja (OR: 2.92, CI: 1.12-9.15, p=0.041), a 3-point reduction in KSS (mean: 3.10, CI: 1.45-4.76, p<0.001), and more than double the odds of reporting constant pain (OR: 2.49, CI 1.25-5.32, p=0.009) when compared to a partial fat pad resection **(Table 2)**. However, complete fat pad resection was no longer associated with a reduction in range of motion following risk adjustment.

DISCUSSION AND CONCLUSION: Our study highlights complete fat pad resection as a potential risk factor for patella baja and constant pain after a TKA, as well as statistically significant but likely clinically irrelevant reductions in patient reported (i.e., KSS) and functional outcomes (i.e., range of motion). These results highlight the need for further prospective studies to clarify the role of fat pad resection in optimizing postoperative outcomes.

Table 1. Incidence and distribution of postoperative outcomes among those with complete or partial fat pad resection. FP = fat pad, IQR = interquartile range, *p<0.001

	Overall	Full FP Resection	Partial FP Resection	p-value
	(N = 647)	(N = 378)	(N = 269)	
Knee Society Score [median (IQR)]	97 [92, 100]	95 [90, 100]	98 [94, 99]	<0.001*
Constant Pain [n(%)]	47 (7.3%)	36 (9.5%)	11 (4.1%)	0.013*
ROM Median [median (IQR)]	115 [110, 125]	115 [105, 120]	120 [110, 125]	0.007*

Table 2. Relationships between type of fat pad resection and outcomes following multivariable risk adjustment. FP = fat pad, *p<0.001

Outcome	Full vs. Partial FP Resection	p-value
New Patella Baja (OR)	2.92 (1.12, 9.15)	0.041*
Knee Society Score (mean)	-3.10 (-4.76, -1.45)	<0.001*
Constant Pain (OR)	2.49 (1.25, 5.32)	0.009*
Range of Motion (mean)	-1.89 (-3.80, 0.03)	0.053