Achieving 90 Degrees of Flexion at 2-Weeks is the Most Significant Predictor of Achieving Full Flexibility After Primary Total Knee Arthroplasty

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INTRODUCTION: Achieving full flexibility after total knee arthroplasty (TKA) is one of the most important factors in knee function, outcomes, and patient satisfaction. There is a critical time period post-operatively to attain this as minimal improvements are unlikely after 3 months. This relies on active patient participation with or without physical therapy (PT). Upon discharge, easy-to-understand instruction was given to patients to obtain 90 degrees of flexion by their 2-week postoperative visit. The purpose of this prospective study was to determine whether this can predict achievement of full ROM by 6-weeks following TKA, regardless of PT.

METHODS: All patients undergoing primary TKA for osteoarthritis (OA) by three fellowship-trained surgeons from October 2023 to April 2024 were prospectively enrolled. Demographics, patient-reported outcomes measures (PROMs), and active ROM were recorded preoperatively. Operative factors including anesthesia data, surgical approach, implant, and cemented vs press-fit components were documented. ROM was recorded at 2- and 6-weeks follow-up. Full ROM at 6-weeks postoperatively was defined as 120 degrees of active knee flexion.

RESULTS: 240 patients were included. Of these, 186 (77.5%) patients achieved at least 90 degrees of flexion at 2-weeks while 54 (22.5%) did not. Using logistic regression, 90 degrees of flexion by 2-weeks postoperatively (OR, 13.2 [95% CI, 5.02 – 45.6]; p<0.001) and not participating in formal PT (OR, 8.18 [95% CI, 3.66 – 21.0]; p<0.001), were identified as significant predictors for achieving full ROM at 6-weeks following TKA. Upon receiver operating characteristic (ROC) analysis, achieving 93 degrees of flexion by 2-weeks postoperatively was found to be a significant predictor for achieving full ROM by 6-weeks postoperatively (AUC=0.740, p<0.001).

DISCUSSION AND CONCLUSION:

Attaining 90 degrees of flexion at 2-weeks following TKA was the strongest predictor for patients achieving full ROM by 6weeks postoperatively. Future studies are needed to determine the predictive value of ROM on long-term patient outcomes.

	≥ 90 Degrees Active Flexion (a=186)	< 90 Degrees Active Flexion (n=54)	p-value
Age (years)	69.2±8.01	67.7 ± 9.98	0.284
Sex			0.520
Female	117 (62.9%)	37 (68.5%)	
Male	69 (37.1%)	17 (31.5%)	
Race			0.668
Black	20 (10.8%)	8 (14.8%)	
Other	23 (12.4%)	5 (9.26%)	
White	143 (76.9%)	41 (75.9%)	
Othnicity			0.536
Hispanic or Latino	2 (1.08%)	1 (1.85%)	
Not Hispanic or Latino	184 (98.9%)	53 (98.2%)	
Lateniity			0.641
Left	81 (43.6%)	26 (48.2%)	
Right	105 (56.5%)	28 (51.9%)	
Preoperative Active ROM (degrees)			
Extension	5.95 ± 6.65	6.74 + 6.42	0.263
Floxion	110 ± 10.0	108 ± 12.3	0.825
BMI (kg/m ²)	31.4 ± 5.30	30.6 ± 5.15	0.520
ASA	2.47 ± 0.51	2.46 ± 0.57	0.869
	3.73 ± 1.61	3.94 ± 2.17	0.549
Preoperative KOOS-JR	50.9 ± 11.3	52.4 = 9.83	0.514
reoperative VR-12 PCS	37.8 ± 8.37	39.0 ± 6.50	0.282
Type of Anesthesia			1.00
General	8 (4,30%)	2 (3.70%)	
Spisal	178 (95.7%)	52 (96.3%)	
Cut to Close Time (minutes)	69.1 ± 13.6	70.9 ± 14.6	0.437
istimated Blood Loss (mL)	122 ± 75.9	100 ± 75.3	0.111
ntraoperative TXA (mg)	1242 ± 453	1205 ± 521	0.565
Fourniquet Use			0.285
None	144 (77.4%)	38 (70.4%)	
Applied	42 (22.6%)	16 (29.6%)	
Tourniquet Time (min)	69.0 ± 24.2	87.8±17.5	0.108
Surgical Approach			
Modial Parapotellar	186 (100%)	54 (100%)	
Knoe Type			0.092
Cruciate Retaining	46 (24.7%)	7 (13.0%)	
Posterior Stabilized	140 (75.3%)	47 (87.0%)	
Component Fixation			0.877
Committed	82 (44.1%)	23 (42.6%)	
Press-Fit	104 (55.9%)	31 (57.4%)	
Length of Stay (days)	0.89 ± 0.86	0.91 ± 0.68	0.485

	≥50 Degrees Active Flexion (n=186)	< 90 Degrees Active Flexion (a=54)	p-value
PT Requirement			0.020
None	132 (71.0%)	47 (87.0%)	
Surgeon Preference	54 (29.0%)	7 (13.0%)	
2-Week PO Active ROM (degrees)			
Extension	2.60 ± 3.75	5.37 ± 9.84	0.002
Resion	96.3 ± 7.63	74.4 ± 16.8	<0.001
PT Requirement			<0.001
None	107 (57.5%)	4 (7.41%)	
Limited ROM	25 (13.5%)	43 (79.6%)	
Surgeon Prefavence	54 (29.0%)	7 (13.0%)	
6-Week PO Active ROM (degrees)			
Extension	1.76 ± 3.33	2.33 ± 4.26	0.671
Flotion	113 ± 10.6	101 ± 13.7	<0.001
Underwent MUA			<0.001
No	185 (99.5%)	46 (85.2%)	
Yes	1 (0.54%)	8 (14,8%)	

alues given as mean = 5D er N (4). MC range of motion, 26A, American Society of Anesthesiologists physical status classification; *BMI*, body mass dec; CCJ, Age-adjusted Charlion controbidity index; *ROOS-NG*, Knee Injury and Deteoarthritis Outcome Score for in Replacement; *Pre12*, V wetname SRen 12 is then balle survey; *PCS*, Horsical compensate strong; *ToX*, Harnesanic