Evaluating the Effect of Posterior Tibial Slope on Postoperative ROM and Complications after TKA

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INTRODUCTION:

Osteoarthritis of the knee is a prevalent degenerative joint disease impacting approximately 14 million individuals in the U.S. and 250 million globally. Total Knee Arthroplasty (TKA) is a common surgical intervention for patients with severe osteoarthritis unresponsive to conservative treatments, aiming to alleviate pain and improve range of motion (ROM). The posterior tibial slope (PTS), the posterior inclination of the tibial plateau, created during tibial resection in TKA, is believed to influence postoperative knee stability and flexion. Previous studies have reported mixed outcomes on the impact of postoperative PTS on ROM, with the majority focusing on one-year follow-ups. This study aims to assess the effects of PTS on postoperative ROM and complications in TKA patients over a two-year period.

METHODS: We retrospectively analyzed 240 patients who underwent TKA between May 2017 and June 2021. Demographic data, postoperative ROM, and complications were collected from medical records. Postoperative PTS was measured using lateral radiographs. Descriptive statistics were reported, and linear regression analysis was performed to determine the correlation between postoperative PTS and ROM. Analysis of variance (ANOVA) was used to determine if there was a significant difference in ROM between three different groups of PTS. Finally, t-tests were used to evaluate the impact of PTS on postoperative complication rates.

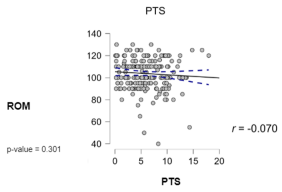
RESULTS:

The cohort's average age was 64.35 years. The average amount of days between the TKA and the last follow up appointment was 446 days .The mean PTS was 5.916°. There was no significant correlation between postoperative PTS and final ROM ($p = 0.301$ $r = -0.070$). Patients with PTS <6° had a mean ROM of 104.062°, while those with PTS >6° and <12°4 had a mean ROM of 103.238° and those with PTS >12° and <18° had a mean ROM of 104.091°. Regarding complications, 4.85% of patients experienced lysis of adhesions, with those affected showing a significantly lower mean ROM ($p < 0.001$). Other complications, including PJI (0.88%) DVT (3.08%), and Revision (1.76%) did not show significant differences in ROM ($p > 0.05$).

DISCUSSION AND CONCLUSION: The findings indicate that postoperative PTS does not significantly impact ROM up to two years post-TKA. However, a higher incidence of lysis of adhesions correlates with decreased ROM, emphasizing the importance of monitoring and managing this complication. The results suggest that while PTS may not be a critical factor in enhancing postoperative ROM, it remains a relevant consideration for reducing specific complications. Limitations include the retrospective nature of the study and variations in radiographic measurements. PTS is a modifiable surgical factor in TKA with potential implications for postoperative outcomes. This study highlights the lack of significant impact of PTS on ROM but underscores the association with lysis of adhesions, suggesting a need for comprehensive postoperative management to optimize patient outcomes.

Descriptives

	Age in Years (± SD)	BMI (± SD)	PTS (± SD)	Days Follow Up Post Op (± SD)
Mean	64.353 (±8.16)	33.55 (±5.54)	5.916 (± 3.41)	446 days (± 374)



Post-operative Complication Profile

	% (N)	Mean ROM	p-value
Revision	1.76% (4)	103.614	0.984
Lysis of Adhesions	4.85% (11)	104.486	< 0.001
PJI	0.88% (2)	103.604	0.885
DVT	3.08% (7)	103.664	0.771

Range of Motion

Group (°)	N	Mean ROM	SD	p-value
1 PTS (0-6)	129	104.062	12.612	0.908
2 PTS (6-12)	84	103.238	14.097	
3 PTS (12-18)	11	104.091	20.835	