PROMIS-10 is a Liability for Total Knee Replacement in a Pay-for-Performance Reality

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INTRODUCTION:

In value-based care, patient-reported outcome measures (PROMs) are increasingly tied to reimbursement, quality reporting, and registry participation. The KOOS JR is a brief, knee-specific PROM used in total knee arthroplasty (TKA), while PROMIS-10 offers a validated global measure of physical and mental health. To support KOOS JR's use in these settings, this study evaluates its correlation with PROMIS-10 Physical scores, responsiveness to change, and minimum clinically important difference (MCID) thresholds. Additionally, we examine whether this relationship remains consistent across the spectrum of patient recovery by stratifying outcomes based on KOOS JR improvement.

METHODS:

We retrospectively reviewed 972 primary TKA cases performed by seven fellowship-trained surgeons, at a single surgical facility, between May 26, 2023, and May 21, 2024. All patients completed KOOS JR, PROMIS-10 Physical, and PROMIS-10 Mental assessments preoperatively and at 1 year postoperatively. We calculated descriptive statistics and change scores. Paired t-tests assessed significance, and Cohen's d quantified effect sizes. MCIDs were determined using a distribution-based method (½ pre-op SD) for KOOS JR and PROMIS-10 Physical, and an anchor-based KOOS JR threshold of 16 points (Dekhne et al. 2024). To assess whether correlation between KOOS JR and PROMIS-10 Physical scores varied by magnitude of recovery, patients were stratified into quartiles based on KOOS JR delta.

RESULTS:

KOOS JR improved from 50.77 ± 13.84 to 75.26 ± 15.81 (Δ = 24.49; p < .001; d = 1.37), and PROMIS-10 Physical increased from 42.06 ± 7.04 to 48.14 ± 8.30 (Δ = 6.08; p < .001; d = 0.78) (Table 1). PROMIS-10 Mental showed a smaller improvement (Δ = 0.93; p < .001; d = 0.13). MCID achievement was 85% for KOOS JR (distribution), 67% (anchor), and 62% for PROMIS-10 Physical (Table 2). KOOS JR and PROMIS-10 Physical demonstrated moderate to strong correlations at all time points (r = 0.60–0.63) (Table 3). Stratified analysis showed that this correlation was strongest among high recovery responders (r = 0.43), weaker in moderate recovery responders (r=0.17 and r=.04), and moderately positive in poor recovery responders (r=0.38) (Table 4 and Figure 1).

DISCUSSION AND CONCLUSION:

KOOS JR is responsive, easy to administer, and demonstrates strong alignment with global physical recovery among patients with the greatest score improvement, supporting its use in value-based care and quality reporting in patients who do well. However, stratified analysis reveals that the relationship between knee-specific and global physical improvement is not uniform across all patients. In those with only modest KOOS JR gains, the weak correlation with PROMIS-10 Physical may reflect disagreeing recovery patterns influenced by comorbidities, psychosocial factors, or limited perceived functional gains beyond the knee. Among poor responders, moderate correlation suggests that functional limitations may be consistently reflected across both knee-specific and global measures, potentially indicating a broader failure to recover. These findings underscore the strength of KOOS JR in tracking recovery in high-performing patients, while also suggesting the potential reimbursement liability of PROMIS-10 in a pay-for-performance model.

Table 1. Preoperative and 1-Year Postoperative PROM Scores with Change Scores, Statistical Significance, and Effect Sizes

(n=972)	Pre-Op	1 Year Post-Op	Delta	P-value	Effect Size
PROMIS-10 Physical	42.06 ± 7.04	48.14 ± 8.30	6.08 ± 7.77	< .001	0.78
PROMIS-10 Mental	31.42 ± 6.43	32.34 ± 6.36	0.93 ± 6.95	< .001	0.13
KOOS JR	50.77 ± 13.84	75.26 ± 15.81	24.49 ± 17.67	< .001	1.37

* P-value calculated with a paired T-test between Pre-op and 1 Year Post-Op

Table 2. Minimum Clinically Important Difference (MCID) Achievement for PROMIS-10 Physical and KOOS JR Scores

Measure	MCID Value	Percent Achieving MCID
P-10 Physical Distribution Method [a]	3.46	62%
KOOS JR Distribution Method [a]	6.92	85%
KOOS JR Anchor Method [b]	16	67%

a. Distribution method calculated by one-half of the preoperative standard deviation.
b. Anchor Method: KOOS MCID of 16 from Dekhne et al. 2024.

Table 3. Pearson Correlation Coefficients Between KOOS JR and PROMIS-10 Physical Scores

	Correlation
Pre-op	0.63
1 year Post-op	0.63
Delta (1-year post-op – Pre-op)	0.60

Table 4. Stratified Correlation Between KOOS JR Delta and PROMIS-10 Physical Delta Across Recovery Quartiles

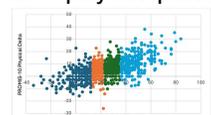| Stratified Group	n	KOOS JR Delta				PROMIS-10 Physical Delta				Correlation
		AVG	STDEV	MAX	MIN	AVG	STDEV	MAX	MIN	
Poor Recovery	243	2.94	8.89	13.08	-34.05	0.41	8.42	22.80	-15.90	0.38
Moderate POOR	243	19.81	2.91	23.02	15.11	4.66	6.66	22.80	-26.18	0.04
Moderate High	243	29.92	3.59	35.01	23.02	7.11	7.13	27.90	-18.20	0.17
High Recovery	243	48.08	9.71	84.06	35.33	12.12	12.12	38.10	-7.80	0.43

Figure 1. Scatter Plot of KOOS JR Delta vs. PROMIS-10 Physical Delta colored by stratified group.