

What are the Patient Acceptable Symptom State and Substantial Clinical Benefits for Pain, Function, and Quality of life after Primary Total Knee Arthroplasty?

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INTRODUCTION:

Although patient-acceptable symptom state (PASS) and substantial clinical benefits (SCB) represent potentially powerful metrics for the assessment of outcome after TKA, limited literature and inconsistencies in calculations added to the difficulty in their interpretation. The aim of this study was to determine the PASS and SCB for the KOOS, KOOS-12, and KOOS JR versions reported 1-year after TKA.

METHODS:

A prospective, multi-center cohort of 11,093 unilateral primary TKA patients was evaluated. Demographic data, comorbid conditions, and PROMs including HOOS, HOOS-12, and HOOS JR were collected pre-op and at one-year postop. A 5-point Likert ISAR satisfaction scale was used as an anchor to identify very satisfied patients. PASS was calculated using anchor-based methods including mean of 1-year postop score in the very satisfied patients with 95% CI and ROC analysis using: 1) Youden index to determine the cut-point with measurement of AUC and sensitivity and specificity for each cut-point; 2) 80% specificity cut-point. SCB was calculated using anchor-based methods including mean of PROMs score change from baseline to 1-year postop in the very satisfied patients with 95% CI and ROC analysis using: 1) Youden index to determine the cutoff point with measurement of AUC and sensitivity and specificity for each cut-point; 2) 80% specificity cut-point. A bootstrapping method was used to validate the PASS and SCB thresholds.

RESULTS:

A total of 8811 patients (79.4%) were very satisfied 1-year after TKA. Regarding PASS, the mean 1-year postop scores ranged from 78.3 (KOOS QoL) to 91.6 (KOOS pain) (**Table 1**). Using Youden index, the PASS thresholds ranged from 56.3 (KOOS QoL) (**Figure 1**) to 81.8 (KOOS ADL) (**Figure 2**) which were comparable to PASS thresholds reported at 80% specificity ranging from 62.5 (KOOS QoL) to 85.3 (KOOS ADL). All PASS thresholds showed acceptable or excellent ability to discriminate between very satisfied patients and neutral or dissatisfied patients with AUC ranging from 0.77 to 0.83 ($P < 0.001$). Regarding SCB, the mean PROMs score improvement ranged from 37.5 (KOOS JR) to 53.2 (KOOS QoL) (**Table 2**). Using Youden index, the SCB thresholds ranged from 23.5 (KOOS JR) (**Figure 3**) to 35.4 (KOOS 12 ADL) (**Figure 4**) which were comparable to SCB thresholds reported at 80% specificity ranging from 23.4 (KOOS JR) to 35.2 (KOOS QoL). All SCB thresholds showed acceptable or excellent ability to discriminate between very satisfied patients and neutral or dissatisfied patients with AUC ranging from 0.74 to 0.80 ($P < 0.001$).

DISCUSSION AND CONCLUSION:

PASS and SCB thresholds for KOOS, KOOS 12, and KOOS JR and their pain, function, and quality of life domains have been validated across a large prospective cohort in this study. These measures can serve as an important reference in practice to assess the clinical success of TKA and for future research involving TKA outcome.

