

## No Differences in Patient-Reported Outcome Measures Following Primary Total Knee Arthroplasty in Patients with Sleep Apnea

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**INTRODUCTION:** Sleep apnea affects over 10% of the adult population. There is conflicting research on the impact of sleep apnea on postoperative outcomes following primary total knee arthroplasty (TKA). Many studies have reported an increased risk of respiratory complications, deep vein thrombosis, and other complications while others report no differences. No current studies have analyzed the effect of sleep apnea on Patient-Reported Outcome Measures (PROMs) following primary TKA. This study aims to compare PROMs and postoperative complications following primary TKA between patients with and without preoperative sleep apnea with a propensity-matched analysis.

**METHODS:** Using an institutional database, 11,210 consecutive patients who underwent primary TKA were identified retrospectively following IRB approval. A 1:3 propensity-match was conducted based on 1) age, 2) gender, 3) body mass index, 4) Charlson Comorbidity Index, and 5) American Society of Anesthesiologists score. The Patient-Reported Outcomes Measurement Information System (PROMIS) Physical Function Short Form 10a (SF-10a), PROMIS Global Health Physical (PROMIS Physical), PROMIS Global Health Mental (PROMIS Mental), and the Knee Injury and Osteoarthritis Outcome Score-Physical Function Short Form (KOOS-PS) were extracted. Absolute scores, change in (delta) scores, and the Minimal Clinically Important Difference (MCID) were calculated for each PROM. The proportion of each group that achieved improvement, no change, and worsening was recorded. Ninety-day and one- and two-year complications were recorded.

**RESULTS:** Following propensity-matching, 402 patients with sleep apnea and 1,206 patients without sleep apnea were available for analysis. No differences in 90-day or one- or two-year complications between groups ( $p > 0.05$ ). Postoperative SF-10a were significantly lower in the sleep apnea group, ( $p = 0.0386$ ). Preoperative and postoperative PROMIS Mental scores were lower among sleep apnea patients, with scores of 48.77 and 50.03 compared to 50.62 and 52.28 in the non-sleep apnea group ( $p = 0.005$ ;  $p < 0.001$ ). Postoperative scores and delta scores were significantly lower in the sleep apnea group for the PROMIS Physical, with scores of 45.44 and 5.01 compared to 46.90 and 5.99 in the non-sleep apnea group ( $p = 0.004$ ;  $p = 0.082$ ). In the KOOS-PS, sleep apnea patients had mean postoperative scores of 68.20 compared to 69.92 in the non-sleep apnea group ( $p = 0.0261$ ). No differences were seen in improvement, no change, and worsening rates in any of the PROMs.

**DISCUSSION:** Sleep apnea was not associated with increased medical or surgical complications following primary TKA. Although sleep apnea was associated with worse general patient-perceived health outcomes, similar improvement proportions and delta scores indicate that TKA facilitated knee-specific improvement in this population. Patients with sleep apnea should be counseled on their expectations prior to undergoing TKA.

**SIGNIFICANCE/CLINICAL RELEVANCE:** Although sleep apnea may be associated with worse general patient-perceived health outcomes following primary TKA, proportions of clinically significant improvement, no change, and worsening were equal between patients with and without sleep apnea.

	No Sleep Apnea	Sleep Apnea	P Value
<b>SF-10a</b>			
Postop Score	42.80 ± 7.54	41.84 ± 7.36	<b>0.0386</b>
Delta Score	6.07 ± 6.92	5.50 ± 6.45	0.1318
MCID-I	742 (66%)	243 (67%)	0.8599
<b>PROMIS Global Mental</b>	N = 1143	N = 379	
Postop Score	52.28 ± 8.79	50.03 ± 9.15	<b>&lt;0.001</b>
Delta Score	1.66 ± 6.91	1.26 ± 6.80	0.2456
MCID-I	528 (46%)	170 (45%)	0.6936
<b>PROMIS Global Physical</b>	N = 1144	N = 379	
Postop Score	46.90 ± 8.36	45.44 ± 8.16	<b>0.004</b>
Delta Score	5.99 ± 7.44	5.01 ± 6.91	<b>0.082</b>
MCID-I	727 (64%)	252 (66%)	0.33
<b>KOOS-PS</b>	N = 916	N = 282	
Postop Score	69.92 ± 15.43	68.20 ± 14.58	<b>0.0261</b>
Delta Score	15.07 ± 16.67	14.11 ± 16.01	0.3644
MCID-I	637 (70%)	197 (70%)	0.9784

**Table 1.** Patient-Reported Outcome Measures for patients with and without sleep apnea undergoing primary total knee arthroplasty.