Short-Term Post-Op Opioids Associated with Better Early Functional Recovery After Hip Replacement, Less so for Knee Replacement

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Key Findings:

- Patients who received a short-term opioid prescription within seven days of a hip replacement surgery had a slightly higher proportion of top-tier functional scores at three months (69.8%) compared to those who did not receive opioids (59.3%).
- After knee replacement, three-month functional scores were similar between groups, with 35.5% of opioid-prescribed patients and 31.4% of those without opioids scoring in the top-tier.
- The hip replacement and knee replacement groups both improved substantially following surgery regardless of opioid prescription status: the share of patients with the worst functional scores dropped from as high as 19.1% before surgery to 2–4% at three months.

Hip and knee replacements, formally known as total hip arthroplasty (THA) and total knee arthroplasty (TKA), are commonly performed surgical procedures intended to relieve pain and restore functional ability by replacing damaged joint surfaces. Recovery typically involves physical therapy and pain management. Opioid prescriptions have historically been a cornerstone of acute postoperative pain management following joint replacement, though their role has come under increasing scrutiny amid broader concerns about opioid-related harms.[1] Prior research has demonstrated that preoperative opioid use is associated with worse patient-reported outcomes following arthroplasty, including lower functional scores, longer hospital stays, and higher rates of persistent opioid use.[2] However, less is known about the relationship between short-term postoperative opioid prescriptions and functional recovery as measured by validated patient-reported outcome instruments. The Hip Disability and Osteoarthritis Outcome Score for Joint Replacement (HOOS, JR)[3] and Knee Injury and Osteoarthritis Outcome Score for Joint Replacement (KOOS, JR)[4] are widely endorsed outcome measures for THA and TKA, respectively, with scores ranging from 0 (extreme disability) to 100 (no limitations).

To understand the relationship between opioid prescriptions and functional recovery after joint arthroplasty, we studied 1,296 adults who underwent THA and 1,960 adults who underwent TKA between January 2022 and January 2025 with recorded baseline and follow-up scores. We excluded patients who had active opioid prescriptions beyond 30 days after surgery, underwent revision surgery or bilateral same-day procedures, or had another arthroplasty before the follow-up score was obtained. Patients who received a short-term opioid prescription were matched with those who did not receive an opioid prescription based on surgery type and baseline functional score. Because of this, both groups started with identical score profiles.

Three months after hip replacement surgery, both those who received short-term opioids and those who received no opioids showed substantial improvement. Among patients who received an opioid prescription, 69.8% scored 70 or greater at three months, compared to 59.3% of patients who did not receive opioids. The opioid group also had fewer patients remaining in the lowest-scoring range at three months (1.5% vs. 3.7%).

HOOS, JR Score Distribution

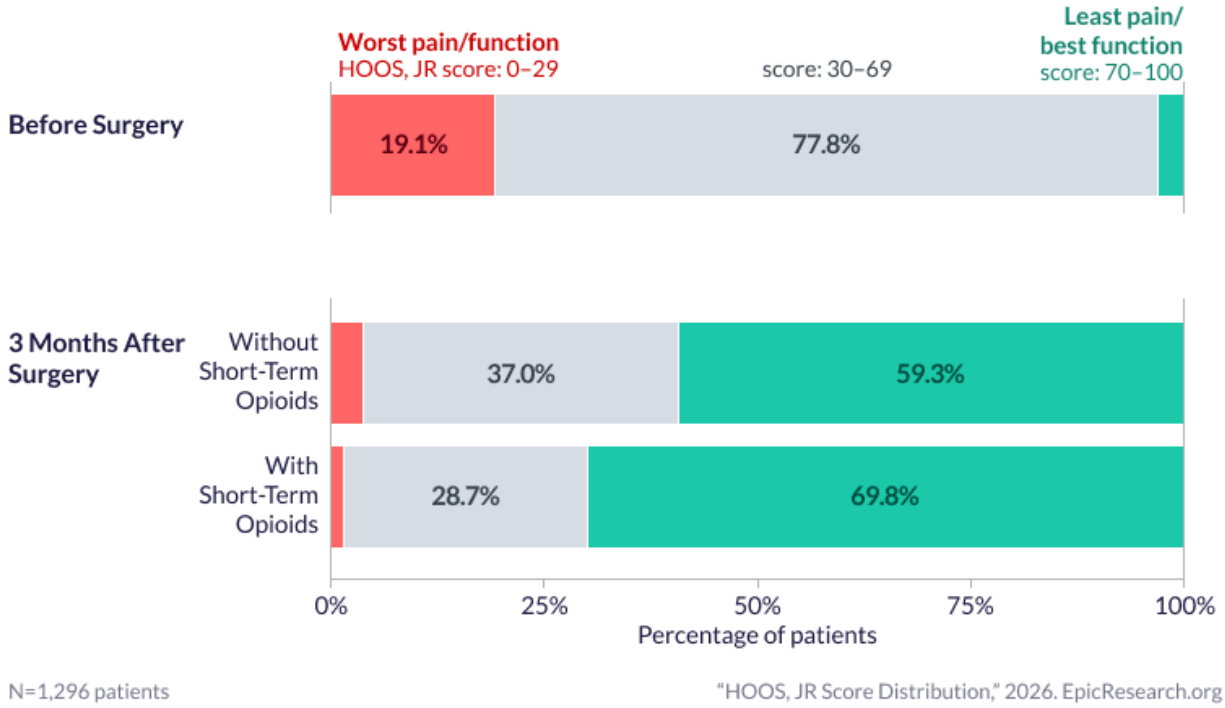

Figure 1. The distribution of HOOS, JR scores among patients who underwent THA at baseline and three months after surgery by whether they received a short-term opioid prescription.

A similar but more modest pattern emerged among knee replacement patients. The proportion reaching scores of 70 or greater was comparable between groups: 35.5% among patients who received opioids and 31.4% among those who did not. Both groups saw sharp reductions in the share of patients with the worst functional scores, dropping from about 10% before surgery to under 3% at three months.

KOOS, JR Score Distribution

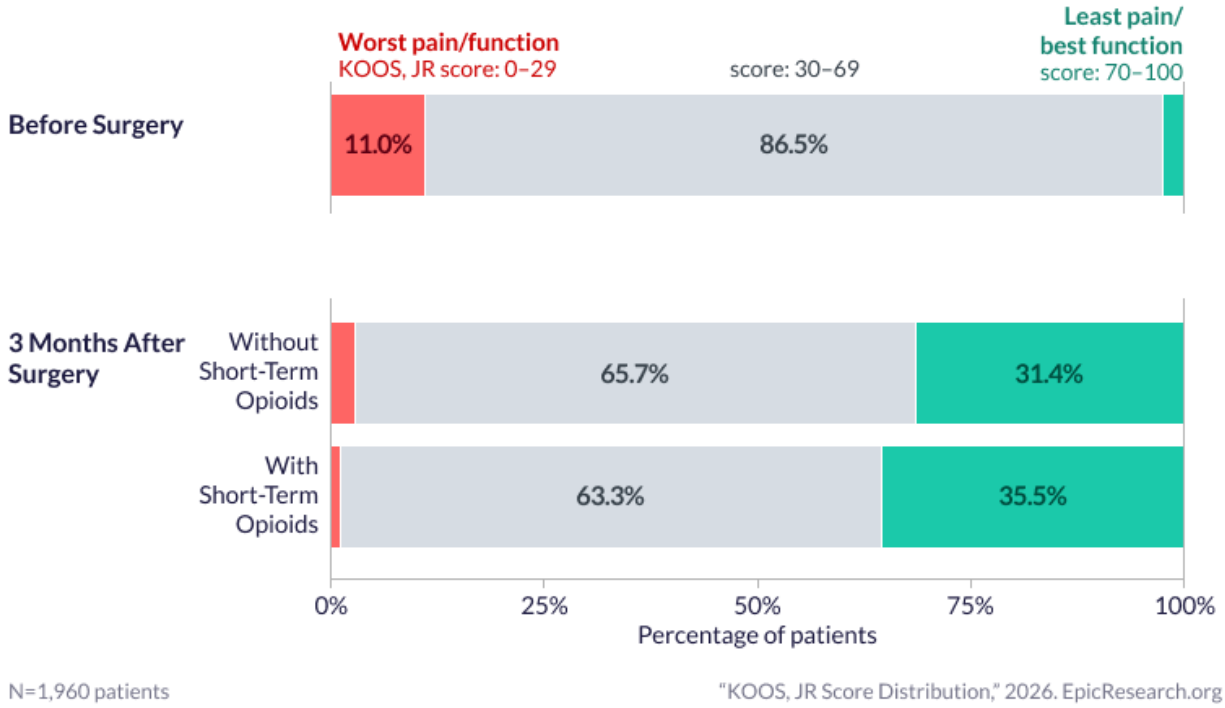

Figure 2. The distribution of KOOS, JR scores among patients who underwent TKA at baseline and three months after surgery by whether they received an opioid prescription.

These data come from Cosmos, a dataset created in collaboration with a community of Epic health systems representing more than 300 million patient records from 2,000 hospitals and more than 47,000 clinics from all 50 U.S. states, Canada, Lebanon, and Saudi Arabia. This study was completed by two teams that worked independently, each composed of a clinician and research scientists. The two teams came to similar conclusions. Graphics by Brian Olson.

References

1. Hannon CP, Fillingham YA, Hamilton WG, Della Valle CJ. Multimodal Analgesia and Anesthesia: Enabling Safe and Rapid Recovery for Total Joint Arthroplasty Patients. J Arthroplasty. 2022;37(9):1669-1670. doi:10.1016/j.arth.2022.07.016
2. Goplen CM, Verbeek W, Kang SH, et al. Preoperative opioid use is associated with worse patient outcomes after Total joint arthroplasty: a systematic review and meta-analysis. BMC Musculoskelet Disord. 2019;20(1):234. Published 2019 May 18. doi:10.1186/s12891-019-2619-8
3. Lyman S, Lee YY, Franklin PD, Li W, Mayman DJ, Padgett DE. Validation of the HOOS, JR: a short-form Hip Replacement Survey. Clin Orthop Relat Res. 2016;474(6):1472-1482.
4. Lyman S, Lee YY, Franklin PD, Li W, Cross MB, Padgett DE. Validation of the KOOS, JR: a short-form Knee Arthroplasty Outcomes Survey. Clin Orthop Relat Res. 2016;474(6):1461-1471.

Data Definitions

Term	Definition
Study period	1/1/2022 through 1/1/2025
Study population: inclusion	Patients: • Aged 18+ at the time of **arthroplasty surgery**

	• With a HOOS, JR or KOOS, JR score documented in the year prior to the surgery, using the score closest to the surgery date as the baseline score • With another HOOS, JR or KOOS, JR score within four months after the surgery, using the one closest to the three-month mark as the follow-up score • With a face-to-face encounter at least 30 days after the surgery
Study population: exclusion	Patients who: • Have an active **opioid** prescription after 30 days after the **arthroplasty surgery** • Have another **arthroplasty surgery** or **revision** before **outcome** score • Have an **arthroplasty surgery** procedure with "bilat" included in the name
Exposures	**Opioid** prescription order between 14 days prior to the arthroplasty surgery through 7 days after the arthroplasty surgery
Outcomes	HOOS, JR or KOOS, JR score the closest to the three months post-surgery point. Considered any scores after the surgery until four months after the surgery.
Arthroplasty surgery	**Total knee arthroplasty** or **total hip arthroplasty**
Matching	Surgeries without opioids prescribed were matched randomly to surgeries with opioid prescriptions 1:7 based on their surgery type and baseline HOOS, JR or KOOS, JR score.
Opioids	ATC code N02A*
Total knee arthroplasty	A procedure with code: CPT: 27447 ICD-9-CM Volume 3: 81.54 ICD-10-PCS: 0SRC069, 0SRC06A, 0SRC06Z, 0SRC07Z, 0SRC0J9, 0SRC0JA, 0SRC0JZ, 0SRC0KZ, 0SRD069, 0SRD06A, 0SRD06Z, 0SRD07Z, 0SRD0J9, 0SRD0JA, 0SRD0JZ, 0SRD0KZ SNOMED CT: 265172001, 392237008, 443681002, 443682009, 444463001, 609588000, 713687000, 1201734006, 1217702001, 1220622006, 1222566006, 1222567002, 1222568007, 1222569004, 1222570003, 1287945008 Additionally, an unmapped procedure with a name containing the text "knee" and either "arthroplasty" or "replace" and which does not contain "partial," "hemiarthroplasty," "revis," "bilat," "unicompartmenal," "hip resurface," "hip hemiresurfac," "hip, resurfac," "arthroplasty hip burmingham resurfacing," "knee resurfac," "arthroplasty resurfac," "arthroplasty, resurfac," or "resurfacing arthroplasty" Procedures with a type of "Surgical History Procedure," "*Unknown," "*Deleted," "*Unspecified," and "*Not Applicable" were excluded
Total hip arthroplasty	A procedure with code: CPT: 27130 ICD-9-CM Volume 3: 81.51 ICD-10-PCS: 0SR9019, 0SR901A, 0SR901Z, 0SR9029, 0SR902A, 0SR902Z, 0SR9039, 0SR903A, 0SR903Z, 0SR9049, 0SR904A, 0SR904Z, 0SR9069, 0SR906A, 0SR906Z, 0SR907Z, 0SR90J9, 0SR90JA, 0SR90JZ, 0SR90KZ, 0SRB019, 0SRB01A, 0SRB01Z, 0SRB029, 0SRB02A, 0SRB02Z, 0SRB039, 0SRB03A, 0SRB03Z, 0SRB049, 0SRB04A, 0SRB04Z, 0SRB069, 0SRB06A, 0SRB06Z, 0SRB07Z, 0SRB0J9, 0SRB0JA, 0SRB0JZ, 0SRB0KZ SNOMED CT: 15163009, 52734007, 265157000, 265160007, 314491003, 426618001, 426904006, 443435007, 770606008,

	1230048008, 1231410001, 1231411002, 1231412009, 1231413004, 1231414005, 1231415006 Additionally, an unmapped procedure with a name containing the text “hip” and either “arthroplasty” or “replace” and which does not contain “partial,” “hemiarthroplasty,” “revis,” “bilat,” “unicompartmenal,” ”hip resurfac,” “hip hemiresurfac,” “hip, resurfac,” “arthroplasty hip burmingham resurfacing,” “knee resurfac,” “arthroplasty resurfac,” “arthroplasty, resurfac,” or “resurfacing arthroplasty” Procedures with a type of “Surgical History Procedure,” ”*Unknown," "*Deleted," "*Unspecified," and "*Not Applicable" were excluded
Revision Definition	A procedure with code: CPT: 27486-27488, 27090-27091, 27134, 27137 ICD-9-CM Volume 3: 81.53 SNOMED: 280462001, 62402000, 16117008, 29712008 ICD-10-PCS codes: 0SW900Z, 0SW904Z, 0SW908Z, 0SW909Z, 0SW90BZ, 0SW90JZ, 0SW930Z, 0SW934Z, 0SW935Z, 0SW938Z, 0SW93JZ, 0SW944Z, 0SW94JZ, 0SW9X0Z, 0SW9X4Z, 0SW9X5Z, 0SW9X8Z, 0SW9XJZ, 0SWB04Z, 0SWB05Z, 0SWB07Z, 0SWB08Z, 0SWB09Z, 0SWB0BZ, 0SWB0JZ, 0SWB0KZ, 0SWB34Z, 0SWB3JZ, 0SWB44Z, 0SWB48Z, 0SWB4JZ, 0SWB4KZ, 0SWBX0Z, 0SWBX4Z, 0SWBX5Z, 0SWBX8Z, 0SWBXJZ, 0SWBXKZ, 0SWC03Z, 0SWC04Z, 0SWC05Z, 0SWC07Z, 0SWC08Z, 0SWC09Z, 0SWC0JZ, 0SWC0KZ, 0SWC34Z, 0SWC35Z, 0SWC3JZ, 0SWC44Z, 0SWC47Z, 0SWC48Z, 0SWC4JZ, 0SWC4KZ, 0SWCX4Z, 0SWCX5Z, 0SWCX8Z, 0SWCXJZ, 0SWD00Z, 0SWD03Z, 0SWD04Z, 0SWD05Z, 0SWD07Z, 0SWD08Z, 0SWD09Z, 0SWD0JZ, 0SWD0KZ, 0SWD34Z, 0SWD3JZ, 0SWD44Z, 0SWD47Z, 0SWD48Z, 0SWD4JZ, 0SWD4KZ, 0SWDX0Z, 0SWDX4Z, 0SWDX5Z, 0SWDX7Z, 0SWDX8Z, 0SWDXJZ, 0SWDXJZ
Face-to-face encounter	An encounter of type Emergency, Office Visit, Well Child, Follow-up, Telemedicine, Urgent Care, Walk-In, Routine Prenatal, Postpartum Visit, Fetal Care Consult, Hospital Outpatient Visit, Hospital Outpatient Visit to Inpatient, Inpatient Admission, or Emergency to Inpatient
International considerations	International patients were considered.
Model specifications	Descriptive distributions of HOOS, JR and KOOS, JR scores at baseline and three months after surgery. Patients were matched 7:1.

Table 1. HOOS, JR Score Distribution

HOOS, JR Score	Before Surgery, No Opioids	Before Surgery, Opioids	After Surgery, No Opioids	After Surgery, Opioids
0-29	19.14%	19.14%	3.70%	1.50%
30-69	77.78%	77.78%	37.04%	28.66%
70-100	3.09%	3.09%	59.26%	69.84%

Table 2. KOOS, JR Score Distribution

KOOS, JR Score	Before Surgery, No Opioids	Before Surgery, Opioids	After Surgery, No Opioids	After Surgery, Opioids
0-29	11.02%	11.02%	2.86%	1.28%
30-69	86.53%	86.53%	65.71%	63.27%
70-100	2.45%	2.45%	31.43%	35.45%