

Office Tip

Fewer Pills for Fewer Problems: Strategies for Reducing Postoperative Opioid Prescribing Following Total Joint Arthroplasty

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ABSTRACT

Opioid overprescribing is a concern within the field of arthroplasty, and a growing body of evidence suggests surgeons can prescribe smaller quantities of opioids for orthopaedic postoperative pain management without compromising patient care. Current literature indicates prescribing trends in arthroplasty are shifting in response. Our institution has prioritized quality improvement projects focused on multimodal pain control for patients undergoing total joint arthroplasty procedures in an active attempt to reduce postoperative narcotic use. We highlight tips for instituting similar initiatives based on our institution's experience, including communication strategies, the importance of establishing the expectation for postoperative pain management by the orthopaedic surgery team, and the role for postoperative pill counts. Future initiatives aimed to facilitate these changes, including the upcoming legislation the Nonopioids Prevent Addiction in the Nation Act, are discussed.

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Discussion

The role of postoperative opioids in the opioid crisis

Despite increasing awareness, national and local policy shifts, and public health interventions, the opioid epidemic persists with serious consequences [1]. Opioid-related overdose is responsible for 81,806 deaths in 2022 alone [2]. Opioid analgesics are commonly prescribed following surgical interventions [3], and despite their potential adverse effects, remain highly utilized for their effective management of acute postoperative pain [4]. Prior work has shown that large quantities of unused opioids remain with patients following surgical recovery, with upwards of 70% of opioid pills prescribed perioperatively going unused for a majority of surgical patients [5]. While these medications may provide benefit to patients by reducing pain and increasing their ability to participate in postoperative physical therapy, they carry multiple established risks in the short term, including respiratory

depression and sedation, postoperative urinary retention, increased rates of infection, and poor mobilization leading to increased incidence of deep venous thrombosis and pulmonary embolism [6–8]. In the longer term, these narcotic medications pose a risk for addiction. Research suggests that over 50% percent of misused opioids come from the leftover prescriptions of a friend or family member's supply [9]. Prescription opioids were implicated in 14,716 of the overdose deaths in 2022, accounting for over 17% of all opioid overdose-related deaths that year [2,10]. In addition to the dangers posed by diversion, consumption carries its own risks; the prescription of greater quantities of opioids postoperatively has been associated with increased opioid consumption [11–13]. Increased postsurgical consumption may be a contributor to long-term opioid usage and the development of opioid use disorder [14–16]. Research suggests a percentage of opioid-naïve patients become chronic opioid users after exposure following major or minor surgery [14,15,17–19], including 4% of total hip (THA) and 8% of total knee arthroplasty (TKA) patients [19]. Given these risks to patients and the wider community, efforts to decrease postoperative opioid prescribing have received increasing attention.

Traditionally, pain management following total joint arthroplasty (TJA) has relied on a postoperative opioid use to address

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perioperative pain and, within the subspecialty of TJA, to facilitate the early mobility required for proper postoperative recovery. The pain associated with orthopaedic injuries and surgery combined with the high volume of orthopaedic procedures performed likely underlies the finding that orthopaedic surgeons are the third highest prescribers of opioids among physicians [20,21]. Orthopaedic surgeons are responsible for prescribing 7.7% of opioid prescriptions in the United States, behind only primary care providers (PCPs) and internists [20]. Some reports suggest orthopaedic responsibility for an even higher percentile of 8.8% of prescriptions [21]. THA and TKA represent 2 of the most common orthopaedic surgeries performed; modeling performed in 2018 estimated annual procedure volume by 2030 will range from 572,000 to 633,000 for primary THA [22–24] and 1.16–3.48 million for primary TKA [22,24–26]. Given the sheer procedural volume in the setting of continually rising demand, it becomes apparent the central role arthroplasty surgeons can have in decreasing opioid availability for abuse and diversion to prioritize both patient wellbeing and public health.

Multimodal pain management and beyond

Minimizing opioid prescribing in orthopaedic practice has been fueled by adoption of multimodal pain management (MMPM) methods which utilize a combination of systemic medications and regional techniques to target multiple pain pathways with the goal to enhance pain relief. The concept of MMPM has been widely adopted in orthopaedic practice over the last decade [27], but predates this time frame, built upon the work of Kehlet et al. who labeled the practice “balanced analgesia” in 1999 [28]. A growing body of high-quality literature supports the efficacy as well as superiority of MMPM compared to opioids alone for managing musculoskeletal postoperative pain. A systematic review by Karlsen et al. in 2017 included 113 randomized controlled trials and reported on 8407 patients undergoing TKA with different pain management interventions. Individual meta-analyses were conducted for some of the included analgesia regimens, with findings indicating that the use of femoral nerve blocks, local infiltration analgesia, intra-articular injections, nonsteroidal anti-inflammatory drugs (NSAIDs) or cyclooxygenase-2 inhibitors, or a combination of both gabapentinoids led to a significant reduction in morphine consumption and postoperative pain [27,29]. Importantly, subsequent findings investigating outcomes following MMPM have continued to add evidence to this report, in THA [30,31] and [32,33] TKA. Between 2020 and 2022, the American Association of Hip and Knee Surgeons (AAHKS) published clinical practice guidelines supported by meta-analyses regarding the recommended use for medications that can fall under the multimodal anesthesia and analgesia umbrella following TJA: including acetaminophen [34,35], NSAIDs [36,37], gabapentinoids [38,39], opioids [7,40], corticosteroids [41,42], periarticular injection [43,44], ketamine [45], regional nerve blocks of the knee [46,47], and regional nerve blocks of the hip [48,49]. While the use of specific medications and modalities remains institution-specific and subject to debate, MMPM is now standard perioperative care for TJA. Despite the progress in this field and ongoing advancements informed by studies from the anesthesia literature, the scope of MMPM has historically been limited to the immediate perioperative period.

Surgeon-driven changes have expanded this work beyond the immediate postoperative time and begun to address ways to limit opioid use following discharge. A recent survey of AAHKS membership indicates that there has been a significant shift in postoperative opioid prescribing practices of arthroplasty surgeons since the last survey was performed in 2018 [50,51]. The average

number of opioids prescribed following TJA has decreased by over 35% following TKA and 59% following THA when compared to responses from 5 years ago [50,51]. Additionally, of the 516 respondents included in this AAHKS survey, nearly all (92.0%) reported the use multimodal analgesics in addition to opioids [50]. These changes in clinical practice are informed by current research findings. Utilizing institution-specific enhanced recovery protocols built on MMPM principles, several groups report the success of opioid-sparing postoperative care following THA [52,53] and TKA [53–55]. This research is often presented in the form of small cohort studies of patients preselected for the targeted intervention, or else as part of quality improvement (QI) interventions, with patients stratified into a preintervention or postintervention group following practice adoption of reduced opioid prescribing policies. Our institution has recently undertaken a similar QI intervention within our arthroplasty practice to track and reduce postoperative narcotic use following THA and now TKA. We report on our institution's experience and tips and tricks we have learned while prioritizing these changes.

Office tips

Tip 1: communicating expectations regarding opioid use and pain management

The role of joint replacement education

Over the past several years, the field of arthroplasty has undergone several changes, including shifts toward preoperative patient optimization and outpatient surgery. Patients see their physician as well as other members of the orthopaedic care team, including practice nurse practitioners and physician assistants, multiple times before surgery. Such visits allow for attempts at nonoperative treatment of symptoms as well as discussion of modifiable risk factors including obesity, HgA1C, and nicotine cessation to optimize patients toward fitness for outpatient surgery. Benefits of this structure include greater familiarity between patient and providers relationship and a stronger therapeutic alliance. As primary TJA has rapidly shifted to an outpatient procedure [56,57], with most patients returning home within 24 hours of their THA or TKA surgery, it has become imperative to ensure the patient's understanding of the procedure and expected recovery preoperatively. Joint replacement education classes preoperatively have become standard at high-volume joint replacement centers [58]. Studies have shown that participation in these classes leads to improved patient knowledge, reduced anxiety, and better postoperative outcomes [59,60]. O'Reilly et al. demonstrated that “joint school” significantly improved patient understanding of their surgery and postoperative care in a prospective study of TKA and THA patients [59]. Similarly, Sisak et al. found that preoperative education classes reduced the length of hospital stay for high-risk patients undergoing TKA [60]. At our institution, a key component of joint replacement classes has included education on the MMPM protocols we utilize as well as discussion of the role for postoperative opioids and expected usage based on data collected from our practice.

Surgeon management of postoperative pain

Additionally, throughout these joint replacement education classes we emphasize the importance of pain management and scheduled follow-up with the primary surgeon and orthopaedic care team. Prior work by Namba et al. found that PCPs are the most frequent providers of opioid prescriptions for patients undergoing TJA, and that orthopaedic providers accounted for just 37% of opioid prescriptions for TKA patients and 28% of THA patients in the year after surgery [61]. This finding is not unexpected, as most

patients have a longstanding and trustful relationship with their PCP and may be more inclined to reach out to their PCP when struggling with pain control. The shift toward preoperative optimization allows surgeons to establish longitudinal relationships with patients as well as clearly communicate the expectation that postoperative musculoskeletal pain related to TJA surgery should be addressed by their arthroplasty practice. In addition to prioritizing optimal patient management, this emphasis is necessary to reduce the burden on our primary care colleagues. Tucker et al. found that a significant portion of postdischarge TJA care falls on primary care services, with out-of-hours general practitioner services and emergency department visits common within the first 90 days post-TJA, indicating a substantial reliance on primary care for managing orthopaedic postoperative issues [62]. Similarly, Shah et al. noted that rapid discharge and outpatient TJA introduced a significant burden of care to the surgeon that did not necessarily translate to more frequent specialist visits, suggesting that this burden often shifts to PCPs to manage routine postoperative care and complications. Both studies were published before the removal of THA from the inpatient-only list by the Centers for Medicare & Medicaid Services (CMS) on January 1, 2020, suggesting current burden may be higher. Clear patient expectations regarding postoperative orthopaedic pain management have been helpful to our practice ensure optimal and standardized postoperative care as well as minimize opioid utilization.

Tip 2: the integral role of counting pills

Collecting data

Central to patient counseling and joint replacement education has been the use of surgeon and practice-level QI data to reassure patient concerns about postoperative pain and to establish expectations regarding expected opioid usage. Over the past 3 years, our practices have introduced QI initiatives to lower postoperative prescribing for TJA. This included gradual changes performed on a surgeon-specific basis based on results from internal targeted interventions to select patients fit for an initial “low postoperative opioid” cohorts in THA and TKA, guided by enhanced recovery after surgery principles [63]. Globally, exclusion criteria for these interventions included any revision procedure, surgeries performed for fracture, and any patient with preexisting renal or liver insufficiency that limited the utilization of MMPM interventions. Patients with preoperative opioid use and/or opioid use disorder and/or >1 opioid prescription were excluded due to clinical suspicion of opioid tolerance. At our institution, pain management for patients with chronic opioid use and/or a history of opioid

tolerance is managed by a multidisciplinary team informed by pain management division within the anesthesia department. Results from these initiatives, performed by A.J.R., were then shared practice- and institution-wide (Fig. 1).

Utilizing the electronic medical record (EMR)

Integral to instituting practice-wide change was first understanding the trends in the opioid utilization patterns of our postoperative TJA patients. To do this, we instituted protocols for pill counts at the 2-week postoperative visit, recording the number of opioid pills remaining of each patient's postoperative narcotic prescription (hydrocodone-acetaminophen, hydromorphone, oxycodone, or tramadol). This process quickly yielded limitations in our current practices to address. Many patients were not certain of the number of opioid pills they utilized, and data were skewed because the group most likely to recall the number remaining with certainty was the group that did not utilize any of their opioid medication. To overcome this limitation, we began requesting that patients bring in their prescriptions to their office appointment to count their pills once roomed. Accurate data collection then revealed variation in midlevel provider opioid prescribing practice. Integral to team-based orthopaedic care at our institution without residents, we clarified with nurse practitioners and physician assistants desired postoperative pill scripts for patients selected for the “low opioid” intervention, ie, those who did not meet the exclusion criteria.

At this time, we also decided on prescribing protocols in the instance that patients called into the office due to poorly controlled pain as well as a standard way of documenting phone calls and patient portal (MyChart; Epic Systems, Verona, WI) messages made for this reason for ease of future data analysis. Assistance from application support for the electronic medical record (EMR) system, EPIC (Epic Systems) at our institution, allowed us to standardize the recording of postoperative pill counts. Smart phrases were created to easily pull this information to include it in postoperative clinic notes. Based on this standardization, subsequent EPIC (Epic Systems) reports can draw this information for evaluation of trends that does not require manual chart review. With greater understanding of patient postoperative opioid utilization before QI intervention, we began selecting patients suitable to receive smaller scripts. This has been tremendously effective and appears to be a highlight of the 2-week postoperative visits. Anecdotally, many patients appear to enjoy reporting on their lack of use of narcotic medication to their surgeon and orthopaedic team.

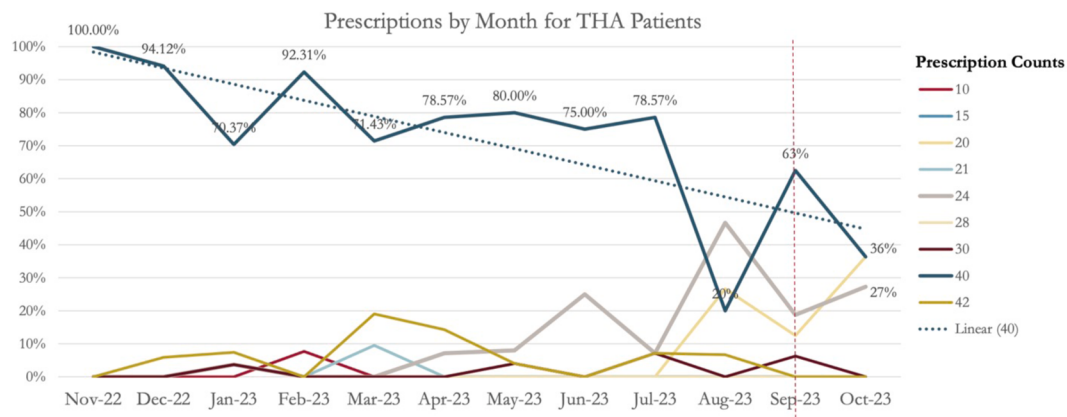


Figure 1. Trends in postoperative opioid prescribing following THA by 1 surgeon at our institution from 2022 to 2023.

With moderate adjustments, these EMR strategies have been successful in allowing us to understand trends in patient opioid prescribing and usage for our TJA patients. Additionally, we have been able to capture within the EMR opioid use within the 90 days preceding surgery, a mandatory CMS variable required for risk stratification for inpatient TJA patients that will also be required for outpatient TJA starting in 2027. We now track postoperative phone calls, refill requests, emergency department visits, and patient-reported outcome measures to ensure inadequate pain control is not increasing burden on the health system nor compromising patient outcomes. We began collecting postoperative pill counts in November 2022, with the aim to understand opioid prescribing patterns following THA, in the setting of an established and practice-standardized multimodal perioperative pain management protocol that utilized pro re nata oxycodone for breakthrough pain (Supplementary Table 1). Based on pills remaining, our QI initiative evolved the goal to reduce the standard postoperative opioid prescription for primary THA patients from 420 to 240 oral morphine equivalents (OMEs) (Fig. 1). Between 2022 and 2024, mean discharge opioid quantity was reduced by 43% from 318.69 OMEs to 182.67 OMEs without increase in narcotic refill requests. Ongoing work in our practice is focused on TKA prescribing patterns. Pill counts have since become part of the regular intake for patients across all arthroplasty teams at our practice (performed by medical assistants as part of rooming procedures at the same time vital signs are collected). Similar interventions are underway within the shoulder and pediatric orthopaedic practices at our institution.

Implementation of this system occurred over time and was in large part successful due to the high level of investment by practice team members in the single surgeon trial phase, notably the physician's medical assistant who performed pill counts and added this information to the EMR and the research team (2 full time employees) who assisted with data analysis. Meetings occurred regularly to evaluate percent capture and troubleshoot areas for improvement among stakeholders across the process. As the implementation of these protocols involved existing staff, there were no additional fees required outside of the time investment of all involved parties.

Tip 3: Planning for an opioid-sparing future

The Nonopioids Prevent Addiction in the Nation (NO PAIN) act

Most centrally relevant to the future of MMPM and opioid-sparing TJA is the dawn of the NO PAIN Act (Nonopioids Prevent Addiction in the Nation) for the CMS. The NO PAIN Act is a legislative initiative aimed at expanding access to nonopioid pain management options for Medicare beneficiaries starting January 1, 2025. This act mandates that CMS provide separate payments for nonopioid treatments used in outpatient surgical settings, including ambulatory surgical centers and hospital outpatient departments. By providing financial incentives for the use of nonopioid pain management options by anesthesia providers—through coverage of these medications for the Medicare population outside of the inpatient setting—this act aims to reduce the reliance on opioids for postoperative pain control in the outpatient setting.

This policy change aligns with the global recommendations highlighted by Sherman and Newland in 2022, [64] who emphasized at that time the need for expanded policy considerations to minimize perioperative opioid dispensing. The act encourages the adoption of MMPM strategies, including the use of nonopioid analgesics such as NSAIDs, acetaminophen, gabapentinoids, as well as regional anesthesia techniques, including continuous peripheral nerve blocks, and cryoneurolysis in efforts to enhance

patient safety in the perioperative period. Many of the regional anesthesia techniques covered in this act are relevant to arthroplasty practice, including sciatic nerve blocks in the popliteal fossa and adductor canal blocks. There is no specific mention of fascia iliaca blocks nor lumbar plexus blocks, a mainstay of pain management for THA, in this legislation. However, the medication EXPAREL (bupivacaine liposome injectable suspension; Pacira BioSciences, Inc, Brisbane, CA) will now be covered. EXPAREL (Pacira BioSciences) has shown mixed results in improving outcomes for TJA, particularly in reducing opioid use and managing pain [65–67], yet has gained popularity and remains an important component of MMPM in TJA that will now be more readily available for CMS patients in outpatient surgical settings. By financially supporting opioid alternatives, the NO PAIN Act aims to promote broader utilization of nonopioid MMPM, thereby reducing opioid prescribing. This shift is expected to decrease the risk of long-term opioid use and misuse and help to address this critical public health issue.

QI initiatives in research

Shifting prescribing patterns in arthroplasty in the setting of policy changes making MMPM more feasible are important steps for popularizing opioid-sparing arthroplasty. However, especially for surgeons outside of larger academic institutions with designated resources, the approval process for prospective research can be daunting. Fortunately, QI initiatives are often subject to less stringent institutional review board (IRB) approval processes, facilitating the implementation of such protocols and the sharing and publication of resulting data. According to Lynn et al. most QI activities are considered an intrinsic part of normal health-care operations and are not classified as human subjects research, therefore, they generally do not require full IRB review, but should still undergo appropriately calibrated supervision as part of professional clinical practice oversight [68]. While QI initiatives must still adhere to ethical standards, they typically require far fewer steps for IRB approval compared to other types of medical research, reflecting their necessary role in routine health-care improvement rather than experimental investigation.

Summary

Given the potential risk for abuse and diversion of prescriptions postoperatively, it is necessary for orthopaedic surgeons to balance the need for acute pain management with the need to limit the excessive prescribing of opioid medications [23–25]. The effort to reduce opioid prescribing is undertaken with the clinical understanding that pain control following TJA remains essential for reducing postoperative complications, improving patient satisfaction, and ensuring patient recovery and rehabilitation [69]. Ongoing research continues to support the viability and success of opioid-sparing MMPM postoperative care models following TJA, and recent AAHS survey results [50,51] demonstrate that the subspecialty of arthroplasty as a whole is moving to adopt these practices. At our institution, QI initiative and protocols designed to limit orthopaedic postoperative opioids are underway with early signs of success. With the upcoming introduction of the NO PAIN Act to help facilitate opioid-sparing perioperative care, we hope these office tips can assist other institutions in modifying existing postoperative opioid prescribing practices in efforts to prioritize patient and public health outcomes.

Conflicts of interest

Adam Rana receives royalties from, is on the Speakers bureau/paid presentations for, and is a Paid consultant for Smith &

Nephew; receives Research support from Zimmer; and is a Board member/committee appointments for Eastern Orthopedics Association and AAHKS.

The other authors declare there are no conflicts of interest.

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CRedit authorship contribution statement

Catherine M. Call: Writing – review & editing, Writing – original draft, Methodology, Investigation, Conceptualization. **Mary Noyes:** Writing – review & editing, Visualization, Methodology, Investigation, Formal analysis, Data curation. **Kamli N.W. Faour:** Writing – review & editing, Investigation, Data curation, Conceptualization. **Diane Jeselskis:** Writing – review & editing, Methodology, Investigation, Formal analysis, Conceptualization. **Adam J. Rana:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Investigation, Conceptualization.

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Supplementary Table 1

Multimodal perioperative pain management protocol for THA at our institution.

Timing	Multimodal perioperative pain management medications for primary THA
Night before procedure	• Pregabalin: 75 mg, PO
Morning of procedure	• Acetaminophen: 1000 mg, PO
Preoperative holding bay	• Oxycontin: 10 mg, PO
Intraoperative management	• Dexamethasone: 10 mg • Limited opioid use
Postoperative	• Acetaminophen: 1000 mg, PO, every 8 h • Celecoxib: 200 mg, every 12 h for 14 d • Pregabalin: 50 mg (if > 70 y old) or 75 mg (if < 70 y old) every 12 h for 3 d • Oxycodone: 5 mg tablets, PO, 1-2 tablets PRN for breakthrough pain up to every 4 h, max 6 tablets per d
Postoperative standard opioid script	• Oxycodone: 5 mg, 24 pills

PO, per os; PRN, pro re nata.