

# Perioperative Pain Management and Anesthesia

## A Critical Component to Rapid Recovery Total Joint Arthroplasty

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### KEYWORDS

• Pain management • Arthroplasty • Multimodal • Periarticular injection • Regional anesthesia

### KEY POINTS

- Proactive, multimodal pain management in the setting of total joint arthroplasty allows for earlier mobilization and leads to enhanced rapid recovery and patient satisfaction.
- Minimizing opioid use is the hallmark of multimodal pain management, improving the targeting of all pain pathways while decreasing perioperative nausea and enhancing rapid participation with postoperative rehabilitation.
- Combined use of local periarticular anesthetic infiltration with avoidance of excessive soft tissue dissection and appropriate use of regional anesthesia improves patient satisfaction and pain control following total joint arthroplasty.
- Failure to control pain following total joint arthroplasty increases medical costs and risk of venous thromboembolism while prolonging overall recovery and length of stay.

### INTRODUCTION

Adequate pain control is a prerequisite of rapid recovery total joint arthroplasty. Patient satisfaction is often linked to appropriate perioperative pain management. The involvement of the anesthesia team in the rapid recovery protocol is critical, with contributions to multimodal analgesia owed to enhanced regional anesthesia and neuraxial techniques. The arthroplasty surgeon and anesthesiologist should aim to capitalize on the most current techniques to achieve successful multimodal pain management.

### MULTIMODAL PAIN MANAGEMENT

The philosophy of multimodal pain management in the setting of total joint replacement refers to the use of multiple types of medications delivered through many different routes with the goal of targeting all pain pathways simultaneously (**Fig. 1**). This strategy reduces the undesired side effects of narcotic medications including nausea, vomiting, sedation, ileus, respiratory depression, and pruritus. The result is improved patient satisfaction and earlier mobilization.

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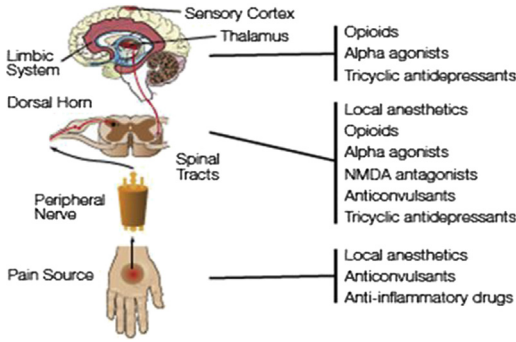
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**Fig. 1.** Medications delivered through many different routes target multiple pain pathways. NMDA, N-methyl-D-aspartate. (©Pacira Pharmaceuticals, Inc. All Rights Reserved. Used Under License.)

**PREEMPTIVE ANALGESIA**

Preemptive analgesia is one of the hallmarks of multimodal pain management. By addressing pain before making the incision, the process of sensitization and production of inflammatory chemicals is prevented. With the absence of nerve fiber sensitization, the patient’s pain threshold is effectively increased resulting in a decreased risk of chronic neuropathic pain and improved pain management.<sup>1</sup>

Treating pain before surgery allows the patient to stay ahead of the pain, which ultimately improves the efficacy of the other modes of treatment. Throughout the postoperative and rehabilitation phases, taking pain medication prophylactically keeps pain to a minimum and avoids peaks of discomfort that may interfere with recovery (**Fig. 2**).

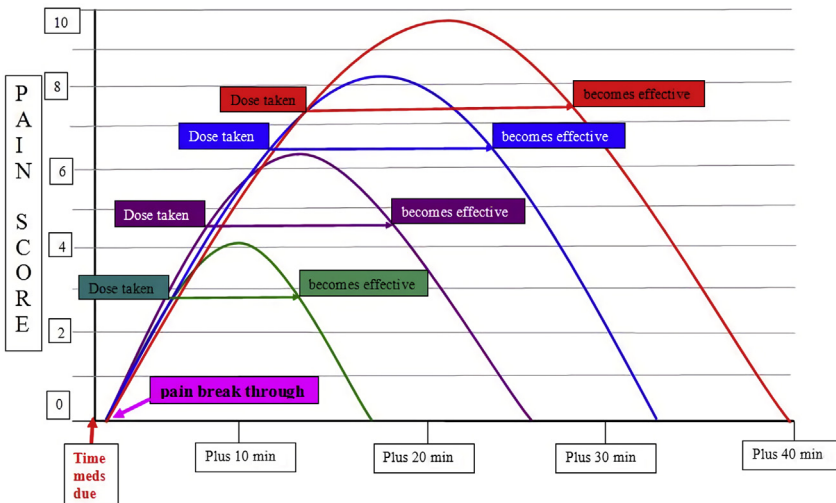
**MEDICATIONS**

Preemptive analgesic medications are typically administered in the preoperative holding area 1 to 2 hours before the procedure but may also be initiated days before surgery. These medications typically include nonsteroidal anti-inflammatory medications (NSAIDs), cyclooxygenase (COX)-2 inhibitors, gabapentinoids, and acetaminophen (**Table 1**).

COX-2 inhibitors are particularly attractive for total joint replacement patients because of their reduced risk of gastric and platelet effects compared with other traditional NSAIDs. These medications have been shown to improve pain scores in total knee arthroplasty (TKA) patients with less opioid consumption and improved range of motion when analyzed in multiple randomized control trials.<sup>2</sup> However, in doses greater than 400 mg daily, COX-2 inhibitors increase the risk of cardiac events and should be used cautiously in patients with active cardiac disease.<sup>3</sup>

Glucocorticoids, specifically dexamethasone and methylprednisolone, are beneficial in the role of preemptive analgesia by decreasing the postoperative inflammatory response. These medications are often given at the time of surgery by the anesthesiologist and work together as an adjuvant treatment to prolong analgesia while reducing nausea and vomiting. Furthermore, they have been used safely without increasing wound complications with short-term use.<sup>4</sup>

One of the effects of preemptive analgesia is reducing narcotic consumption in the perioperative period. Although opioids still play a central



**Fig. 2.** To stay ahead of the pain curve, medication is best administered before high pain levels build up. (Courtesy of [www.BoneSmart.org](http://www.BoneSmart.org).)

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