

# Postoperative Narcotic Prescription Practice in Orthopedic Foot and Ankle Surgery

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## Abstract

**Background:** The misuse and abuse of opioid pain medications have become a public health crisis. Because orthopedic surgeons are the third highest prescribers of opioids, understanding their postoperative pain medication prescribing practices is key to solving the opioid crisis. To this end, we conducted a study of the variability in orthopedic foot and ankle surgery postoperative opioid prescribing practice patterns.

**Methods:** Three hundred fifty orthopedic foot and ankle surgeons were contacted; respondents completed a survey with 4 common patient scenarios and surgical procedures followed by questions regarding typical postoperative pain medication prescriptions. The scenarios ranged from minimally painful procedures to those that would be expected to be significantly more painful. Summaries were calculated as percentages and chi-square or Fisher exact tests were used to compare survey responses between groups stratified by years in practice and type of practice.

**Results:** Sixty-four surgeons responded to the survey (92.8% male), 31% were in practice less than 5 years, 34% 6 to 15 years and 34% more than 15 years. For each scenario, there was variation in the type of pain medication prescribed (*scenario 1*: 17% 5 mg hydrocodone, 22% 10 mg hydrocodone, 52% oxycodone, and 3% oxycodone sustained release [SR]; *scenario 2*: 15% 5 mg hydrocodone, 13% 10 mg hydrocodone, 58% oxycodone, and 9% oxycodone SR; *scenario 3*: 11% 5 mg hydrocodone, 13% 10 mg hydrocodone, 56% oxycodone, and 14.1% oxycodone SR; *scenario 4*: 3% 5 mg hydrocodone, 5% 10 mg hydrocodone, 44% oxycodone, and 45% oxycodone SR) and the number of pills dispensed. Use of multimodal pain management was variable but most physicians use regional nerve blocks for each scenario (76%, 87%, 69%, 94%). Less experienced surgeons (less than 5 years in practice) supplement with tramadol more for scenario 1 ( $P = .034$ ) as well as use regional nerve blocks for scenario 2 ( $P = .039$ ) more than experienced surgeons (more than 15 years in practice).

**Conclusion:** It is evident that variation exists in narcotic prescription practices for postoperative pain management by orthopedic foot and ankle surgeons. With new AAOS guidelines, it is important to try to create some standardization in opioid prescription protocols.

**Keywords:** pain medication, postoperative pain, foot and ankle surgery, prescription variability

Foot and ankle orthopedic surgery can cause significant postoperative pain. It is difficult to manage for a number of reasons, including subjective quantification of pain, differing patient coping skills, as well as known and unknown psychosocial and cultural factors. This variability can make it difficult to estimate narcotic requirements postoperatively. In addition, orthopedic surgeons account for 7.7% of all narcotic prescriptions, which may create significant amounts of unused opioids.<sup>12</sup>

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Misuse of prescription narcotics has become a public health epidemic in the US. Narcotic prescriptions increased from 76 million in 1991 to 219 million in 2011, and although the United States makes up only 5% of the world's population, it consumes 80% of the world's opioids.<sup>9,15</sup> Drug overdose has become the leading cause of injury death in the United States. In 2015, a total of 12.5 million Americans misused prescription opioids, and 2 million had a prescription opioid use disorder with an economic impact of more than \$78 billion.<sup>2</sup>

The causes of the significant rise in opioid prescriptions since the early 1990s are multifactorial. Many experts felt that physicians were undertreating pain, and called for more aggressive treatment, which led to a new policy from the Joint Commission on the Accreditation of Healthcare Organizations (JCAHO) in 2001 that included standards for organizations to improve their pain management, including the use of opioids.<sup>3</sup> Also, in the 1980s, there was inaccurate information being disseminated from medical journals about the safety of opioid medications and, later in the 1990s, aggressive false marketing by pharmaceutical companies, particularly on the safety and efficacy of OxyContin.<sup>11,14</sup> Although it is difficult to say to what degree the various factors played a role in the development of the opioid epidemic, it is likely that some combination of all the above factors played some role in the current epidemic.

Because of the large variability in pain tolerance, it is often difficult to determine the most effective and safest narcotic, appropriate dosage, and treatment duration for each individual patient all the while taking into account the social, psychological, and cultural differences. Patients' perception of effective pain management does not always correlate with the amount or type of pain medication prescribed.<sup>13</sup> Also, mental illness such as depression significantly affects a patient's pain control and perception of pain, and evidence demonstrates that patient coping strategies are more influential on pain control than medication. Our classic method to measure pain control, the visual analog scale, is not an objective measuring tool and culture has a significant influence as well, possibly explaining why Americans use significantly more narcotic pain medications than the rest of the world.<sup>4,6-8,16</sup> The surgeon is often required to rely on personal intuition and experience to provide a best guess on the most effective pain management option.

Narcotic prescription strategies, as well as use of multimodal analgesia, are variable among orthopedic foot and ankle surgeons. In an effort to establish the most effective and safe recommendations for postoperative pain management and to curtail the rising opioid abuse epidemic, it is important to understand this variability in postoperative pain management practices. The purpose of this project was to describe the overall variability of postoperative pain management strategies among orthopedic foot and ankle surgeons and assess if surgeon experience and practice type affect those strategies as well as to discuss strategies to treat pain effectively while reducing the amount of opioids we prescribe.

## Methods

An exempt status was requested and granted for this project prior to any data collection from our institutional review board. Utilizing an orthopedic foot and ankle list server as well as a professional networking website, 350 orthopedic surgeons who classified themselves as foot and ankle specialists were identified and contacted in 2014. The survey was anonymous, and there were no personally identifiable information questions. There was a consent statement at the beginning of the survey (See appendix for survey.)

General demographic information on each surgeon was collected consisting of gender, years in practice (less than 5, 6-20, more than 20), percentage of exclusive foot and ankle practice (less than 50%, more than 50%), and practice environment (academic, private practice, hospital/healthcare system). Four hypothetical orthopedic foot and ankle operative scenarios were described and 5 medication prescription options were given for each scenario (Table 1). Each scenario was unique for the type of surgery, the type of patient, and preoperative narcotic use. The scenarios were presented in a survey format, and, in each scenario, the surgeon was asked to choose from multiple-choice answers the most similar postoperative narcotic prescription he or she would use. The postoperative medication options were chosen based on commonly used medications in orthopedics as observed by the authors. In addition, questions regarding multimodal analgesia (regional nerve block, nonsteroidal anti-inflammatory drugs [NSAID], tramadol, anticonvulsants, and muscle relaxants) and the number of narcotic pills dispensed were asked for each scenario. In this study, tramadol was not considered a narcotic as the data collection was under way prior to the Drug Enforcement Administration reclassifying it as a schedule 4 controlled substance. None of the scenario patients had drug allergies, kidney/liver disease, or other contraindications for using any of the listed medications.

The data were analyzed using IBM SPSS Statistics, v. 23 (Armonk, NY). Summary statistics were calculated for the data and are reported as percentages. The chi-square or Fisher exact tests were used to compare survey responses between academic, private practice, and hospital/health system physicians, as well as for physicians in practice for 5 years or less, 6-15 years, and more than 15 years. Statistical significance was assessed at  $P < .05$ .

## Results

Sixty-four surgeons completed the survey (18% return rate). Fifty-eight (92%) of the respondents were male with an average age of 45 (SD 9.4) years. There was an even distribution of experience: 31% had less than 5 years in practice, 34% 6-15 years, and 34% more than 15 years. The majority of the respondents were practicing primarily foot and ankle orthopedics, with 92% reporting more than 50% exclusive foot and ankle practice. Overall, 39% practice in an

**Table 1.** Patient Scenarios and Medication Choices.

**Scenario 1:** 20-year-old healthy male has lateral ankle instability after sustaining multiple ankle sprains. He is a manual laborer. He takes ibuprofen as needed for the pain and has never taken narcotic pain medication. Operation: Open modified Brostrom

**Scenario 2:** 45-year-old female; BMI 35; otherwise healthy; bimalleolar closed ankle fracture from slip and fall. She has no previous history of ankle/foot problems. The patient is a stay at home mother. She has been taking 2-3 tablets per day of 5-mg hydrocodone since her injury. Operation: ORIF

**Scenario 3:** 65-year-old male, insulin-dependent diabetic, BMI 40, has Charcot arthropathy of the foot and ankle and significant deformity. He has altered but intact sensation. He has a history of low back pain and takes daily acetaminophen and occasional hydrocodone. Operation: Tibiotalocalcaneal arthrodesis and tendo Achilles lengthening

**Scenario 4:** 59-year-old female with posttraumatic ankle arthritis. She has a history of fibromyalgia and chronic pain. She has been on hydrocodone 5-mg, 2-3 tablets per day for over 2 years as well as an antidepressant medication. She is under the care of a chronic pain physician who refuses to make recommendations on postoperative pain medication plan. She is otherwise healthy. Operation: Total ankle arthroplasty and tendo Achilles lengthening.

**MEDICATION CHOICES FOR EACH SCENARIO**

Oxycodone SR with additional narcotic for breakthrough pain  
 Oxycodone/acetaminophen: 1-2 tablets every 4 hours as needed for pain  
 10 mg hydrocodone/acetaminophen: 1-2 every 4 hours as needed for pain  
 5 mg hydrocodone/acetaminophen: 1-2 every 4 hours as needed for pain  
 Nonnarcotic (eg, Tramadol, acetaminophen, and/or NSAID)

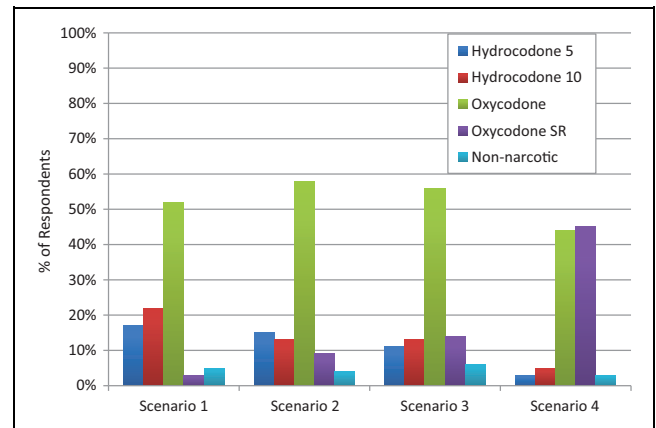
Abbreviation: NSAID, nonsteroidal antiinflammatory drug.

academic setting, 52% were in private practice, and 9% in a healthcare system.

**Scenario 1: Open Modified Brostrom, Young Healthy Opioid-Naïve Patient**

Seventeen percent (17%) of respondents would use 5 mg hydrocodone, 22% 10-mg hydrocodone, 52% oxycodone with acetaminophen, 3% sustained-release oxycodone with a breakthrough narcotic, and 5% would use a nonnarcotic (Figure 1). A variable amount of pills were prescribed for both hydrocodone and oxycodone (Table 2; Figures 2 and 3). Fifty-four (54%) percent of hydrocodone prescribers reported that they have increased the number of pills dispensed for this scenario since it became a schedule 2 narcotic.

For multimodal analgesics, 63% reported that they supplement with an NSAID, 18% supplement with tramadol, 6% with an anticonvulsant (gabapentin, pregabalin), and 6% with a muscle relaxant (eg, cyclobenzaprine). Seventy-six percent (76%) would use a regional nerve block. Surgeons with less than 5 years and 6-15 years of experience

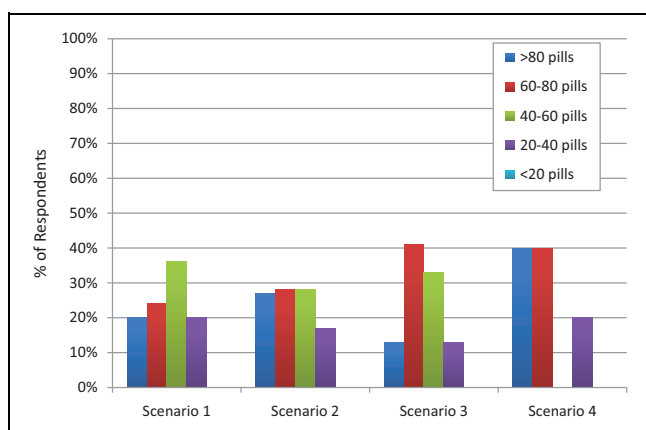
**Figure 1.** Percent of respondents choosing each type of postoperative pain medication by scenario.**Table 2.** Number of Postoperative Pills Prescribed for Each Scenario.

	>80 pills, %	60-80 pills, %	40-60 pills, %	<40 pills, %
<b>Scenario 1</b>				
Hydrocodone	20	24	36	20
Oxycodone	8	22	47	23
<b>Scenario 2</b>				
Hydrocodone	27	28	28	17
Oxycodone	10	36	44	10
<b>Scenario 3</b>				
Hydrocodone	13	40	33	13
Oxycodone	23	31	29	17
<b>Scenario 4</b>				
Hydrocodone	40	40	0	20
Oxycodone	22	37	37	4

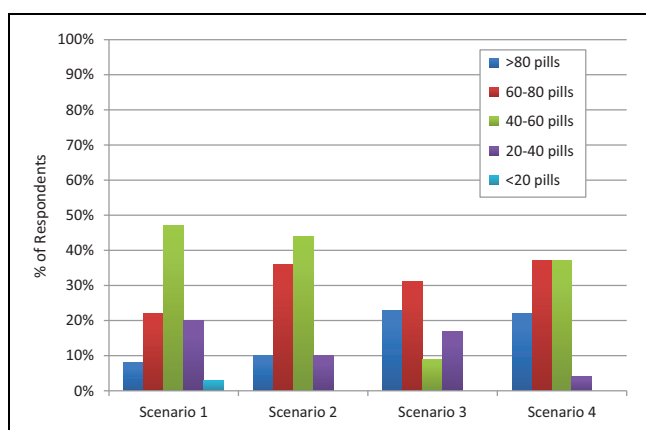
use tramadol more often as a group (85%, 95%) compared to surgeons with more than 15 years' experience (63%,  $P = .034$ ). There were no other significant differences in prescribing practices between groups for experience or practice settings for this scenario.

**Scenario 2: Ankle ORIF, Middle Aged, Relatively Opioid-Naïve Patient**

Fifteen percent (15%) of respondents use 5-mg hydrocodone, 13% 10-mg hydrocodone, 58% oxycodone with acetaminophen, 9% oxycodone SR with a breakthrough narcotic and 4% would use a nonnarcotic (Figure 1). A variable amount of pills were prescribed for both hydrocodone and oxycodone (Table 2; Figures 2 and 3). Forty-seven percent (47%) of the hydrocodone prescribers reported that they have increased the number of pills prescribed for this scenario since hydrocodone became a scheduled 2 narcotic.



**Figure 2.** Percent of respondents choosing a given number of hydrocodone pills for initial postoperative pain prescription by scenario.



**Figure 3.** Percent of respondents choosing a given number of oxycodone pills for initial postoperative pain prescription by scenario.

For multimodal analgesics, 33% reported that they supplement with an NSAID, 18% supplement with tramadol, 7% with an anticonvulsant, and 3% with a muscle relaxant. Eighty-seven percent (87%) surgeons would use a regional nerve block. Surgeons with less than 5 years' experience use a nerve block for this scenario more often as a group (90%) compared to surgeons with 6-15 years (55%) and more than 15 years (62%,  $P = .039$ ). There were no other significant differences in prescribing practices between groups for experience or practice settings for this scenario.

### Scenario 3: TTC Arthrodesis, Older, Insulin-Dependent Diabetes Patient With Chronic Pain

Eleven percent (11%) of respondents would use 5-mg hydrocodone, 13% 10-mg hydrocodone, 56% oxycodone with acetaminophen, 14% oxycodone SR with a breakthrough narcotic, and 6% would use a nonnarcotic (Figure 1). A

variable amount of pills were prescribed for both hydrocodone and oxycodone (Table 2; Figures 2 and 3). Forty percent (40%) of hydrocodone prescribers reported that they have increased the number of pills prescribed for this scenario since hydrocodone became a schedule 2 narcotic.

For multimodal analgesics, 19% reported that they supplement with an NSAID, 19% supplement with tramadol, 21% with an anticonvulsant, and 10% with a muscle relaxant. Sixty-nine percent (69%) would use a regional nerve block. There were no significant differences in prescribing practices between groups for experience or practice settings for this scenario.

### Scenario 4: TAA, Older, Chronic Pain, Opioid-Dependent Patient

Three percent (3%) of respondents would use 5 mg hydrocodone, 5% 10 mg hydrocodone, 44% oxycodone with acetaminophen, 45% oxycodone SR with a breakthrough narcotic, and 3% would use a nonnarcotic (Figure 1). A variable amount of pills were prescribed for both hydrocodone and oxycodone (Table 2; Figures 2 and 3). Sixty percent (60%) of hydrocodone prescribers reported that they had increased the number of pills prescribed for this scenario since hydrocodone became a schedule 2 narcotic.

For multimodal analgesics, 31% reported that they supplement with an NSAID, 24% supplement with tramadol, 23% use an anticonvulsant, and 13% with a muscle relaxant. Fifty-eight (94%) would use a regional nerve block. There were no significant differences in prescribing practices between groups for experience or practice settings for this scenario.

## Discussion

The scenarios presented were designed to represent relatively common surgeries and patients in an orthopedic foot and ankle specialty practice. Even though these scenarios are common to most orthopedic foot and ankle specialists, the methods of postoperative pain control were highly variable, specifically the type and amount of narcotics distributed. There was also inconsistency with the use of nonnarcotic multimodal therapy options to supplemental narcotic analgesia although the majority of the surgeons would use a regional nerve block for all scenarios. The data also show that 40% to 60% of surgeons, depending on the scenario, have increased the number of hydrocodone pills prescribed since the law changed hydrocodone to a schedule 2 controlled substance. There were minimal differences in prescribing practices related to surgeon experience as well as practice setting.

There were a number of limitations to this study. The principal limitation is that the survey tool used in this study was not validated. Moreover, the survey employed a multiple-choice design, which limited the narcotic

options and doses, thus making the results less generalizable. Finally, although the response rate is on par with survey projects, the numbers are low and may not be generalizable to the entire specialty of orthopedic foot and ankle surgery.

Although these results reveal the inconsistency in postoperative opioid medication use, orthopedic surgeons' goals in managing pain are the same. The primary objective in postoperative pain management is to control pain so as to provide the patient with some comfort, as it is unrealistic to completely eliminate pain. However, as this study shows, there is minimal consistency among surgeons as to how best to accomplish this goal in the immediate postoperative period leading to the possibility of overprescribing pain medication.

Because of the psychosocial factors that affect the perception of pain, a single strategy is not likely to be effective for all patients.<sup>3,5</sup> Many studies demonstrate the effectiveness of multimodal analgesia in foot and ankle surgery, and show that it reduces narcotic use and inpatient hospital lengths of stay and decreases pain scores.<sup>10,17</sup> Other strategies to improve pain control while using less opioids include addressing patient expectations early, providing pain contracts, and monitoring for misuse and abuse with state-run drug-monitoring boards.<sup>12</sup> In dealing with patients who are on opioids for chronic pain preoperatively, it is important to address opioid use in the preoperative setting and use multimodal pain management. It is also recommended to quantify pain medication usage in order to stratify patients based on the volume of preoperative narcotic use in an effort to develop a more effective postoperative pain management strategy.<sup>6</sup>

The American Anesthesia Association combined with the American Pain Society recently published guidelines on postoperative pain management.<sup>5</sup> The panel strongly recommends patient perioperative education about pain management with the use of strategies that are individually tailored and inclusive of medical and psychiatric comorbidities. Further, it is recommended to use pain assessment tools with the adjustment of the plan based on the adequacy of treatment and use of multimodal therapies in the form of regional anesthetic acetaminophen, NSAIDs (celecoxib preoperatively particularly), and gabapentin (and pregabalin). Other strong recommendations include administering pain medications orally over intravenously; and utilizing patient-controlled analgesia (PCA) for IV use. In regard to systems, the panel recommends that facilities have committees that create policies and monitor for safe and effective pain management strategies as well as access to chronic pain specialists.<sup>5</sup>

Although these recommendations are pertinent, it is surprising that the large panel did not include any orthopedic surgeons. Orthopedic surgeons are one of the primary prescribers of opioids (third highest prescriber accounting for 7.7% of all opioid prescriptions<sup>12</sup>), and, for orthopedic patients, the vast majority of postoperative pain management

is done by the orthopedic surgeon. The American Academy of Orthopaedic Surgeons (AAOS) recommends standardized opioid prescription protocols consisting of practice-based opioid use consensus, limited prescription size, limited use of extended-release opioids, with the restriction of opioid use in nonsurgical patients.<sup>1</sup> The AAOS also recommends empathetic patient communication, coordination/communication with other providers, opioid use tracking and pain management continuing medical education. With the current variability amongst respondents as demonstrated in this study, to keep with the AAOS guidelines, our profession should consider being at the forefront in developing "practice based opioid use consensus" for foot and ankle surgery.

The Joint Commission (formally JCAHO) has revised their pain management standards in 2017. The new standards include recognition of psychosocial factors during assessment with the involvement of patients in treatment plans by setting measurable goals and promoting nonpharmacologic treatment modalities. It also includes facilitation of prescription monitoring through databases to identify and monitor high risk patients. Finally, the need for patient education and engagement is reinforced, and the necessity of viable treatment options for addicted patients is highlighted.<sup>3</sup>

As a significant source of pain medication prescriptions, orthopedic foot and ankle surgeons need to be at the table when developing proper pain management policy in the setting of this current opioid abuse epidemic. It is important to understand our current practice patterns to find what is effective and what may be contributing to the excess of opioids getting to the general public.

## Conclusion

There exists substantial variability amongst orthopedic foot and ankle surgeons' postoperative pain management strategies. Given the current problems with opioid abuse, orthopedic foot and ankle surgeons should seek to provide their patients with effective postoperative pain management strategies which avoid excessive dependence on narcotic prescriptions.

## Appendix

### Consent Statement

This survey is completely anonymous and the data cannot be and will not be traced back to you. There is no personal identifiable information included in this survey. The patient scenarios are hypothetical and not based on any one patient but from an aggregate of patients seen in a busy orthopaedic foot and ankle practice. By completing and submitting this survey, you are giving us consent to use the data as part of this research project and no other purpose.

## Pain Management Survey

How many years have you been in practice?

- A. 5 years or less
- B. 6-15 years
- C. Greater than 15 years

How much of your practice is exclusive foot and ankle?

- A. Less than 50%
- B. Greater than 50%

Which option best describes your practice environment?

- A. Academic
- B. Hospital/health system (nonacademic)
- C. Private Practice

## Patient Scenarios

The following patients have no drug allergies/sensitivities, and no kidney or liver dysfunction.

*20-year-old healthy male has lateral ankle instability after sustaining multiple ankle sprains. He is a manual laborer. He takes ibuprofen as needed for the pain and has never taken narcotic pain medication. Operation: Open modified Brostrom*

Would you use a regional anesthetic nerve block for this procedure?

- A. Yes
- B. No

Please choose the following postoperative pain medication plan that most closely is aligned with your typical pain management plan for this patient.

- A. Oxycontin SR with additional narcotic for breakthrough pain
- B. Oxycodone/acetaminophen: 1-2 tablets every 4 hours as needed for pain
- C. 10mg hydrocodone/acetaminophen: 1-2 every 4 hours as needed for pain
- D. 5 mg hydrocodone/acetaminophen: 1-2 every 4 hours as needed for pain
- E. Nonnarcotic (eg, Tramadol, acetaminophen and/or NSAID)

If you use oxycodone or hydrocodone, how many tablets do you dispense at time of surgery?

- A. <20
- B. 20-40
- C. 40-60
- D. 60-80
- E. >80

Do you supplement with a NSAID?

- A. Yes
- B. No

Do you supplement with tramadol?

- A. Yes
- B. No

Do you supplement with an anticonvulsant? (eg, gabapentin, pregabalin)

- A. Yes
- B. No

Do you supplement with a muscle relaxant? (eg, cyclobenzaprine)

- A. Yes
- B. No

*45-year-old female; BMI 35; otherwise healthy; bimalleolar closed ankle fracture from slip and fall. She has no previous history of ankle/foot problems. The patient is a stay at home mother. She has been taking 2-3 tablets per day of 5-mg hydrocodone since her injury. Operation: ORIF*

Would you use a regional anesthetic nerve block for this procedure?

- A. Yes
- B. No

Please choose the following postoperative pain medication plan that most closely is aligned with your typical pain management plan for this patient.

- A. Oxycontin SR with additional narcotic for breakthrough pain
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- A. Yes
- B. No

Do you supplement with tramadol?

- A. Yes
- B. No

Do you supplement with an anticonvulsant? (eg, gabapentin, pregabalin)

- A. Yes
- B. No

Do you supplement with a muscle relaxant? (eg, cyclobenzaprine)

- A. Yes
- B. No

*65-year-old male, insulin dependent diabetic, BMI 40, has Charcot arthropathy of the foot and ankle and significant deformity. He has altered but intact sensation. He has a history of low back pain and takes daily acetaminophen and occasional hydrocodone. Operation: Tibiotalocalcaneal arthrodesis and tendoachilles lengthening*

Would you use a regional anesthetic nerve block for this procedure?

- A. Yes
- B. No

Please choose the following postoperative pain medication plan that most closely is aligned with your typical pain management plan for this patient.

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Do you supplement with tramadol?

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- No

Do you supplement with an anticonvulsant? (eg, gabapentin, pregabalin)

- A. Yes
- B. No

Do you supplement with a muscle relaxant? (eg, cyclobenzaprine)

- A. Yes
- B. No

*59-year-old female with posttraumatic ankle arthritis. She has a history of fibromyalgia and chronic pain. She has been on hydrocodone 5 mg, 2-3 tablets per day for over 2 years as well as an antidepressant medication. She is under the care of a chronic pain physician who refuses to make recommendations on postoperative pain medication plan. She is otherwise healthy. Operation: Total ankle arthroplasty and tendoachilles lengthening.*

Would you use a regional anesthetic nerve block for this procedure?

- A. Yes
- B. No

Please choose the following postoperative pain medication plan that most closely is aligned with your typical pain management plan for this patient.

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Do you supplement with tramadol?

- A. Yes
- B. No

Do you supplement with an anticonvulsant? (eg, gabapentin, pregabalin)

- A. Yes
- B. No

Do you supplement with a muscle relaxant? (eg, cyclobenzaprine)

- A. Yes
- B. No

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