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Evidence-based clinical practice guideline for the pharmacologic management of acute dental pain in adolescents, adults, and older adults

A report from the American Dental Association Science and Research Institute, the University of Pittsburgh, and the University of Pennsylvania

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ABSTRACT

Background. A panel convened by the American Dental Association Science and Research Institute, the University of Pittsburgh, and the University of Pennsylvania conducted systematic reviews and meta-analyses and formulated evidence-based recommendations for the pharmacologic management of acute dental pain after simple and surgical tooth extraction(s) and for the temporary management (ie, definitive dental treatment not immediately available) of toothache associated with pulp and periapical diseases in adolescents, adults, and older adults.

Types of Studies Reviewed. The panel conducted 4 systematic reviews to determine the effect of opioid and nonopioid analgesics, local anesthetics, corticosteroids, and topical anesthetics on acute dental pain. The panel used the Grading of Recommendations, Assessment, Development and Evaluation approach to assess the certainty of the evidence and the Grading of Recommendations, Assessment, Development and Evaluation Evidence-to-Decision Framework to formulate recommendations.

Results. The panel formulated recommendations and good practice statements using the best available evidence. There is a beneficial net balance favoring the use of nonopioid medications compared with opioid medications. In particular, nonsteroidal anti-inflammatory drugs alone or in combination with acetaminophen likely provide superior pain relief with a more favorable safety profile than opioids.

Conclusions and Practical Implications. Nonopioid medications are first-line therapy for managing acute dental pain after tooth extraction(s) and the temporary management of toothache. The use of opioids should be reserved for clinical situations when the first-line therapy is insufficient to reduce pain or there is contraindication of nonsteroidal anti-inflammatory drugs. Clinicians should avoid the routine use of just-in-case prescribing of opioids and should exert extreme caution when prescribing opioids to adolescents and young adults.

Key Words. Clinical practice guideline; acute dental pain; tooth extractions; toothache; analgesics; opioids.

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Dentists, emergency medicine professionals, and other providers prescribe medication to manage acute pain for numerous conditions ranging in pain severity from the mild pain associated with having a tooth extracted to the severe pain associated with symptomatic irreversible pulpitis. In a study comparing the change in opioid prescribing regardless of

indication in 2017 and 2018 and in 2008 and 2009,¹ the percentage decrease in morphine milligram equivalents (MME) was 41.3% for dentists and 70.5% for emergency medicine physicians. MME prescribed by physician assistants and nurse practitioners, however, increased by 22.7%. Among the 8 specific provider types examined at both points in time, dentists prescribe the lowest total MME on average, which dropped from 1.02% in 2008 and 2009 to 0.83% in 2017 and 2018.

People in the United States face many challenges in obtaining access to dental treatment, which results in patients seeking treatment at emergency departments^{2,3} where dental chief concerns and diagnoses are frequently managed conditions. Emergency medicine providers, infrequently equipped with clinical expertise to manage dental conditions or an efficient referral system to a dentist, are unable to provide definitive dental treatment and may prescribe analgesics in an attempt to mitigate the acute dental pain until the patient accesses definitive treatment elsewhere. Analgesics prescribed in emergency departments for dental pain frequently include opioids.⁴⁻⁷ Approximately 37% of emergency department visits linked to a dental symptom received an opioid analgesic, and 20.8% received a nonopioid analgesic; among nondental visits, only 14% of the visits received an opioid, and 23.4% received a nonopioid analgesic.⁵

When managing acute dental pain, there are several reasons to consider alternatives to opioids. First, evidence suggests that opioids may not be the best approach to managing what is often inflammation-related acute dental pain. Nonsteroidal anti-inflammatory drugs (NSAIDs) would target the source of the pain, whereas opioids would not.⁸ Relying on opioids to manage acute dental pain can have unintended negative consequences.^{9,10} Dental prescriptions at the recommended MME have been associated with an almost 9% risk of adverse outcomes, such as the need for emergency department care, hospitalization, and naloxone prescription or administration.¹¹ Opioid prescriptions also are associated with an increased risk of patients experiencing major depressive and anxiety disorders.¹²

In 2015, 166 of 1,000 prescriptions written for dental patients aged 11 through 18 years included an opioid.¹³ In 2019, 39.5% of all opioid prescriptions written by dentists were classified as high risk (ie, “prescriptions to opioid-naïve patients exceeding a 3-day supply, prescriptions with daily opioid dosage ≥ 50 morphine milligram equivalents, opioid prescriptions with benzodiazepine overlap”).¹⁴ Adolescents are at an especially increased risk of developing an opioid use disorder, even after a single exposure.^{10,15} For example, adolescents and young adults (aged 13-30 years) undergoing third-molar extraction and filling a perioperative opioid prescription (≥ 1 opioid prescriptions filled 7 days before-3 days after the procedure) was associated with a 0.8% increased risk of persistent opioid use (≥ 1 opioid prescriptions filled anywhere from 4-90 days and 91-365 days after the procedure) and a 1.6% increased risk of receiving a diagnosis of a substance use disorder than patients undergoing a third-molar extraction but not filling an opioid prescription.⁹ In addition, adolescents and young adults filling or receiving an opioid prescription after a dental procedure may have an increased risk of developing long-term opioid use and overdose than those who did not fill or receive an opioid prescription.^{10,11,14}

Although more effective and safer alternatives to opioid analgesics for managing acute pain are available,^{16,17} providers may continue to rely on opioids.^{7,18,19} To mitigate the undesirable effects of opioids, states, hospital systems, and organizations have developed guidance.²⁰⁻³⁹ Although these documents and statements generally come to similar conclusions, clinicians may struggle to determine which guidance to follow as they are not all in complete alignment. Many are not based on systematic reviews of the literature, do not include an extensive stakeholder engagement strategy, nor use transparent and explicit criteria to produce evidence-based recommendations (Appendix 1, available online at the end of this article).

In 2020, given the large variety of methods, processes, and inconsistent recommendations and statements across organizations, the National Academies report “Framing Opioid Prescribing Guidelines for Acute Pain: Developing the Evidence” documented the need to formalize evidence-based alternatives for managing acute pain in clinical practice guidelines (CPGs), disseminate these guidelines, and facilitate their uptake through explicit implementation strategies.⁴⁰ After the release of this report and by Congressional mandate, the US Food and Drug Administration (FDA) funded the development of a CPG and associated dissemination and implementation plans for the management of acute dental pain.

ABBREVIATION KEY

CPG:	Clinical practice guidelines.
FDA:	US Food and Drug Administration.
GRADE:	Grading of Recommendations, Assessment, Development and Evaluation.
MME:	Morphine milligram equivalents.
NSAID:	Nonsteroidal anti-inflammatory drug.
RCT:	Randomized controlled trial.

The purpose of this evidence-based CPG is to provide recommendations to assist patients and clinicians in determining the most appropriate use of pharmacologic strategies for the management of acute dental pain after simple and surgical tooth extraction(s) and the temporary management of toothache associated with pulp and periapical disease.

METHODS

In developing this guideline, the American Dental Association Science and Research Institute, the University of Pittsburgh, the University of Pennsylvania, and McMaster University followed methodological standards defined by the National Academy of Sciences, Engineering, and Medicine and the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) workgroup.^{40,41} This project was financially supported by a grant from the FDA.

Guideline scope

The scope of this guideline focuses on adolescents (aged 12-<17 years), adults (aged 17-<65 years), and older adults (aged ≥65 years) experiencing acute dental pain after tooth extraction(s) or associated with toothache. The panel formulated pharmacologic recommendations for management of acute pain after simple and surgical (ie, extraction of a tooth with the need of a flap or osteotomy) tooth extraction(s), including impacted mandibular third-molar extractions, and the management of acute pain in patients with symptomatic pulpitis (ie, reversible or symptomatic irreversible pulpitis with or without symptomatic apical periodontitis) or pulp necrosis with symptomatic apical periodontitis or acute apical abscess, with no immediate access to definitive dental treatment (eg, a referral from emergency medicine department to a dental practice or a referral from a general dentist to a dental specialist).

Target audience

These recommendations are intended primarily for general dentists. Specialty dentists, dental educators, emergency and primary care physicians, medical and dental students, nurse practitioners, physician assistants, pharmacists, dental therapists, dental hygienists, and policy makers also may benefit from these recommendations.

Guideline development group

We configured 2 supporting groups. The panel was composed of 14 members who were medical and dental clinicians, researchers, epidemiologists, pharmacologists, public health dentists, and a patient representative; they all had extensive expertise or experience in acute dental pain. The methodological team included 16 researchers from the American Dental Association Science and Research Institute, the University of Pittsburgh, the University of Pennsylvania, McMaster University, and the Art of Democracy with expertise in evidence synthesis, guideline development, public engagement, implementation science, and biostatistics. All meetings among group members occurred remotely from December 2020 through December 2021 ([Appendix 2](#), available online at the end of this article).

Guideline development

Clinical Questions

With the facilitation of the methodological team, the panel determined the scope, purpose, target audience, and clinical questions for the guideline. The panel identified 2 major clinical areas that warrant recommendations for this first iteration of the guideline: acute dental pain consecutive to tooth extraction(s) (simple, surgical) and when managing toothache (symptomatic pulpitis [ie, reversible or symptomatic irreversible pulpitis with or without symptomatic apical periodontitis] or pulp necrosis with symptomatic apical periodontitis or acute apical abscess) when no immediate definitive dental treatment is available. Definitive dental treatment includes, but is not limited to, pulpectomy, nonsurgical root canal treatment, incision and drainage of abscess, and tooth extraction. The panel prioritized questions regarding the effect of opioid and nonopioid analgesic medications; corticosteroids administered at any dose or frequency orally, submucosally, or intramuscularly; long-acting (eg, bupivacaine) vs short-acting (eg, lidocaine or mepivacaine) local anesthetics; and topical anesthetics (eg,

benzocaine at any dose and regimen), as these are among the most used interventions to manage acute pain (eBox, available online at the end of this article). The panel identified patient-important outcomes for each set of interventions. For example, for analgesic medications, the panel defined the following outcomes as critical for decision making: pain relief, global efficacy rating, use of rescue analgesia, and serious opioid-specific adverse effects (eg, substance use disorder, long-term persistent use, hospitalization, or overdose). The panel also defined the following outcomes as important but not critical: gastrointestinal adverse effects (ie, nausea and vomiting, abdominal pain, dysphagia, diarrhea, constipation, and dyspepsia), central nervous system adverse effects (ie, dizziness, drowsiness, syncope, mood alteration, headache, and vision-related adverse events), the proportion of patients with greater than 50% study population achieving maximum pain relief (total pain relief: the sum of pain relief scores over time), and the summed pain intensity difference expressed as the percentage of maximum score (sum of pain intensity difference: sum of the pain intensity difference per unit time). Once the panel produced the first draft of the clinical questions, populations, interventions, and outcomes, we implemented the first electronic form to gather input from 31 stakeholder organizations regarding the appropriateness and relevance of the clinical questions, scope, purpose, and guideline's target audience (Appendix 3, available online at the end of this article).

Systematic Reviews and Literature Searches Informing the Guideline

The evidence synthesis team conducted extensive systematic reviews and meta-analyses to address the clinical questions. The complete reports of the reviews' methodology and results can be found elsewhere.⁴²⁻⁴⁴ Evidence from randomized controlled trials (RCTs) was prioritized over observational studies for beneficial outcomes. We included observational data to inform undesirable long-term effects related to opioid medications. We searched MEDLINE via PubMed, Embase, Cochrane Central Register of Controlled Trials, and gray literature from database inception through September 30, 2021, and conducted study selection, data extraction, and risk of bias assessment (using the Cochrane risk of bias tool 2.0 for RCTs⁴⁵ and the Risk Of Bias In Non-Randomized Studies-of Interventions tool for observational studies⁴⁶) independently and in duplicate. The panel members and methodological team frequently interacted to ensure that the reviews provide a clinically sound output. We produced GRADE summary-of-findings tables to display the effect of the interventions in relative and absolute estimates, the number of studies and participants, and the certainty of the evidence per outcome (Appendix 2, available online at the end of this article).

Values and Preferences (Summary of Primary Study)

To inform the recommendations, we conducted a primary study to gather information about values and preferences of people who have experienced acute dental pain and the relative importance they assign to the outcomes associated with opioid and nonopioid analgesic medications. Using this input, we created a values-and-preference statement (Appendix 4, available online at the end of this article) that was validated with the participants and presented to the panel to inform the relative importance of outcomes. A complete report of this study can be found elsewhere.⁴⁷

Development of Recommendations

To guide the process of developing recommendations, the panel used the GRADE Evidence-to-Decision Framework (Appendix 2, available online at the end of this article).⁴⁸ After being presented with the best available evidence, the panel formulated 3 types of guidance⁴⁹: (1) recommendation statements directly informed by the systematic reviews and meta-analyses of the clinical questions, which include the overall certainty of the evidence and strength of recommendation (Table); (2) good practice statements supported by extensive indirect evidence; and (3) the panel's remarks supported by evidence not systematically collected, extensive clinical and research experience, and official documents and advice from relevant stakeholder organizations. The decision-making process prioritized discussion and consensus building. Only when a consensus was not possible did the panel proceed to a vote (simple majority defined the selected course of action).

Table. Definitions of certainty in the evidence and strength of recommendations and implications for patients, clinicians, and policy makers.*

CATEGORY	DEFINITION
Definition of Certainty (Quality) of the Evidence	
High	Very confident that the true effect lies close to that of the estimate of the effect.
Moderate	Moderately confident in the effect estimate. The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
Low	Confidence in the effect estimate is limited. The true effect may be substantially different from the estimate of the effect.
Very low	Very little confidence in the effect estimate. The true effect is likely to be substantially different from the estimate of effect.
Definition of Strong and Conditional Recommendations and Implications for Users	
Implications for patients	
Strong recommendations	Most patients in this situation would want the recommended course of action, and only a small proportion would not. Formal decision aids are not likely to be needed to help patients make decisions consistent with their values and preferences.
Conditional recommendations	Most patients in this situation would want the suggested course of action, but many would not.
Implications for Clinicians	
Strong recommendations	Most patients should receive the intervention. Adherence to this recommendation according to the guideline could be used as a quality criterion or performance indicator.
Conditional recommendations	Recognize that different choices will be appropriate for individual patients and that the clinician must help each patient arrive at a management decision consistent with his or her values and preferences. Decision aids may be useful in helping patients make decisions consistent with their values and preferences.
Implications for Policy Makers	
Strong recommendations	The recommendation can be adopted as policy in most situations.
Conditional recommendations	Policy making will require substantial debate and involvement of various stakeholders.

* Sources: Guyatt⁴¹ and Andrews and colleagues.^{50,51}

External Review and Updating Process

Once the panel produced the first draft of the recommendations and good practice statements, we created a second electronic form. We invited the same stakeholder organizations ([Appendix 3](#), available online at the end of this article) to provide input regarding the statements’ clarity, appropriateness, and relevance. In addition, we collected input from a broader audience through a public comment period via a website and electronic form. The panel processed this feedback, introduced revisions, and produced the final version of the recommendations and good practice statements. Details regarding the updating process are presented elsewhere ([Appendix 2](#), available online at the end of this article).

RECOMMENDATIONS

How to use these recommendations

These recommendations and good practice statements are intended to assist clinicians, patients, policy makers, and administrators when making evidence-informed decisions. They are not intended to be used for the purposes of restricting, limiting, delaying, or denying coverage for, or access to, a prescription issued for a legitimate dental or medical purpose by an individual practitioner acting in the usual course of professional practice. In addition, these recommendations do not replace clinical judgment nor do they cover all clinical issues when managing acute dental pain. We advise clinicians to remain alert for situations warranting a deviation from this guidance.

Values and preferences

Most people identified 2 outcomes as the most influential for decision making: (1) pain relief and (2) substance use disorder. The use of these outcomes varied when participants were presented with hypothetical scenarios ranging from acute mild, moderate, or severe acute dental pain. When presented with mild pain levels, participants placed a much higher value on avoiding any risk of

incurring substance use disorder. Conversely, when presented with scenarios posing severe or very severe pain levels, people placed a much higher value on achieving some level of pain relief at the expense of potentially experiencing substance use disorder. They also valued agency in their consultation with a provider and preferred the possibility of discussing a personalized pain management strategy with their health care provider ([Appendix 4](#), available online at the end of this article).⁴⁷

Recommendations for the pharmacologic management of postoperative pain after simple and surgical tooth extraction(s) in adolescents, adults, and older adults (Box 1, Figure 1)

Summary of Main Findings

Analgesic medications for simple and surgical tooth extraction(s)

Overall, high to moderate certainty evidence from 82 RCTs conducted exclusively in participants undergoing surgical tooth extraction(s) suggests that NSAIDs alone (ie, ibuprofen or naproxen sodium) or in combination with acetaminophen are more effective in reducing postoperative pain than opioid medications. Regarding adverse effects, low to very low certainty evidence suggests that ibuprofen and acetaminophen may exhibit an increased risk of drowsiness than other analgesics assessed. In comparison, opioids increase the risk of dizziness, drowsiness, nausea, and vomiting. In addition, misuse of opioids also is accompanied by a more severe set of adverse events, including long-term persistent use, overdose, hospitalizations due to adverse effects, and mortality ([Appendix 5](#), [eTables 1 and 2](#) available online at the end of this article).⁴²

Oral, submucosal, or intramuscular corticosteroids for surgical tooth extraction(s)

Low to very low certainty evidence from 40 RCTs conducted exclusively in participants undergoing surgical tooth extraction(s) suggests that corticosteroids administered orally, submucosally, or intramuscularly may offer a trivial reduction in pain compared with not using corticosteroids. Due to a paucity of evidence, the panel is uncertain about the magnitude of the potentially undesirable effect of the use of corticosteroids (very low certainty evidence).⁴⁴

Local anesthetics for simple and surgical tooth extraction(s)

Very low certainty evidence from 7 RCTs suggests that bupivacaine administered before discharge could reduce the need for rescue analgesia 8 through 48 hours postoperatively. Moderate certainty evidence indicates that there is probably a negligible difference between bupivacaine and short-acting local anesthetics (ie, 2% lidocaine or 3% mepivacaine) regarding the incidence of adverse effects. The available evidence did not allow the panel to find clinically significant differences between 3% bupivacaine and 4% articaine (very low certainty evidence).⁴³

Remarks

- A patient with breakthrough pain (pain that persists after implementing initial pain management strategy) on the second or third day after simple extraction(s) and surgical (day 1 is the day of the surgery) should return to the clinic so the provider can rule out other clinical conditions responsible for the pain (eg, alveolar osteitis or sharp alveolar ridge after tooth extraction) before being provided a new prescription, especially if an opioid is considered.
- The role that corticosteroids may play in managing inflammatory complications (eg, trismus, facial swelling, or infection) is outside the scope of this guideline. Intravenous administration of corticosteroids is also beyond the scope of this guideline.

Recommendations for the temporary pharmacologic management of toothache (symptomatic pulpitis [ie, reversible or symptomatic irreversible pulpitis with or without symptomatic apical periodontitis] or pulp necrosis with symptomatic apical periodontitis or acute apical abscess) in adolescents, adults, and older adults (Box 2, Figure 2)

Summary of Main Findings

Analgesic medications for toothache

The panel failed to find direct evidence regarding the effect of analgesics on the temporary management of symptomatic pulpitis or periapical disease. Thus, the panel decided to inform these

Box 1. Key recommendations and good practice statements for the pharmacologic management of acute dental pain: postoperative pain after simple and surgical tooth extraction(s) in adolescents, adults, and older adults.

Recommendations

1. For the management of acute postoperative dental pain in adolescents, adults, and older adults* undergoing surgical tooth extraction(s), the panel recommends the postprocedural use of nonopioid analgesics[†] as first-line therapy instead of opioid analgesics (conditional, low certainty).
 - 1.1. For surgical tooth extraction(s), the panel suggests initiating the postoperative pain management using a nonsteroidal anti-inflammatory drug (NSAID) alone (eg, 400 mg of ibuprofen or 440 mg of naproxen sodium) or in combination with acetaminophen (eg, 500 mg) (conditional, low certainty).
 - 1.2. In the rare instances when postprocedural (ie, surgical tooth extraction) pain control using NSAIDs alone is inadequate, the panel suggests the addition to the previous first-line therapy prescription (ie, NSAID) of 325 mg of acetaminophen plus a combination of 325 mg of acetaminophen with an opioid^{‡,§,¶} (eg, 5-7.5 mg of hydrocodone or 5 mg of oxycodone) at the lowest effective dose, fewest tablets, and the shortest duration, which rarely exceeds 3 days (conditional, low certainty).
 - 1.3. In the rare instances when postprocedural (ie, surgical tooth extraction) pain control using NSAIDs in combination with acetaminophen (eg, 500 mg) is inadequate, the panel suggests replacing the initial first-line therapy prescription with an NSAID (eg, 400 mg of ibuprofen or 440 mg of naproxen sodium) and 325 mg of acetaminophen plus a combination of 325 mg of acetaminophen with an opioid^{‡,§,¶} (eg, 5-7.5 mg of hydrocodone or 5 mg of oxycodone). The opioid prescription should consider the lowest effective dose, fewest tablets, and the shortest duration, which rarely exceeds 3 days (conditional, low certainty).
 - 1.4. When NSAIDs are contraindicated,[#] the panel suggests the postprocedural use of acetaminophen alone at full therapeutic dose (eg, 1,000 mg) or 325 mg of acetaminophen plus a combination of 325 mg of acetaminophen with an opioid^{‡,§,¶} (eg, 5-7.5 mg of hydrocodone or 5 mg of oxycodone) at the lowest effective dose, fewest tablets, and the shortest duration, which rarely exceeds 3 days (conditional, low certainty).
 - 1.5. For the management of acute postoperative dental pain in adolescents, adults, and older adults undergoing surgical tooth extraction(s), the panel suggests against adding oral, submucosal, or intramuscular corticosteroids** to standard analgesic therapy (conditional, very low certainty).
2. For the management of acute postoperative dental pain in adolescents, adults, and older adults* undergoing simple tooth extraction(s), the panel recommends the postprocedural use of nonopioid analgesics[†] only and recommends against the use of opioid analgesics (conditional, low certainty).
 - 2.1. For a simple tooth extraction, the panel suggests initiating the pain management using an NSAID alone (eg, 400 mg of ibuprofen or 440 mg of naproxen sodium) or in combination with acetaminophen (eg, 500 mg) (conditional, low certainty).
 - 2.2. When NSAIDs are contraindicated,[#] the panel suggests the postprocedural use of acetaminophen alone at full therapeutic dose (eg, 1,000 mg) (conditional, low certainty).

* The panel defined the following age ranges: adolescents (aged 12-< 17 years), adults (aged 17-< 65 years), and older adults (≥ 65 years). † To minimize adverse effects, analgesic prescriptions should follow the principle of minimum effective dosage to achieve pain relief. The maximum daily dose is 2,400 mg of ibuprofen, 1,100 mg of naproxen sodium, and 4,000 mg of acetaminophen. ‡ This option should not be offered to patients taking gabapentinoids and central nervous system active medications (eg, benzodiazepines, antidepressants, anticonvulsants, and narcotics) or patients already taking opioids for other medical reasons. § When opioids are prescribed, clinicians should obtain informed consent from the patient (or the parent or guardian in the case of minors) with detailed information about potential opioid undesirable effects (eg, physiological dependence, risk of substance misuse, respiratory depression, and adverse effects on driving or operating machinery). This is particularly critical in adolescents and young adults who are at increased risk of subsequent misuse and substance use disorder even after a single prescription. ¶ Alert patients about the risks of cumulative acetaminophen dose and that acetaminophen plus opioid combination contains both drugs in 1 pill. The total dose of acetaminophen should not exceed 4,000 mg per day. # “A drug should be contraindicated only in those clinical situations for which the risk from use clearly outweighs any possible therapeutic benefit. Only known hazards, and not theoretical possibilities, can be the basis for a contraindication.”⁵² ** The role that corticosteroids may play in managing inflammatory complications (eg, trismus, facial swelling, or infection) is not in the scope of this guideline. Intravenous administration of corticosteroids is also beyond the scope of this guideline. †† Blocking or infiltrating using a local anesthetic right before the patient is discharged is 1 additional complementary intervention to provide extended pain relief. This does not replace the need for pain management using analgesics.

Box 1. Continued

3. For the management of acute postoperative dental pain in adolescents, adults, and older adults* undergoing simple and surgical tooth extraction(s), the panel suggests the postprocedural use (ie, before patient discharge^{††}) of 0.5% bupivacaine plus 1:200,000 epinephrine by block or infiltration injection or 4% articaine plus 1:100,000/1:200,000 epinephrine by infiltration injection instead of 2% lidocaine plus 1:100,000 epinephrine or 3% mepivacaine (conditional, low certainty).

Good Practice Statements

- The panel advises clinicians to counsel patients that they should expect some pain and the analgesics should make their pain manageable. The panel also recommends discussing with the patient their past experience, preferences, and values regarding managing acute dental pain before prescribing.
- The panel recommends clinicians thoroughly review the patient's medical and social history (including illicit and recreational drug use), medications, and supplements to avoid overdose and adverse drug-drug interactions.
- To minimize adverse effects, analgesic prescriptions should follow the principle of minimum effective dosage to achieve pain relief and avoid the routine use of delayed (ie, just-in-case prescription for breakthrough pain) opioid prescriptions.
- If an NSAID alone or in combination with acetaminophen fails to provide adequate pain relief, and if opioids are prescribed, counsel patients regarding appropriate storage and disposal.
- The panel recommends clinicians review the state's prescription drug monitoring program when available to determine the coprescribing of other controlled substances (eg, opioids and benzodiazepines). If the patient with acute dental pain is already receiving opioids to manage chronic pain (ie, long-term use of opioids), clinicians should prioritize the use of nonopioid analgesics (ie, first-line analgesic therapy).
- Special care should be taken when prescribing opioids to a patient with a substance use disorder, including communication with the patient's other health care providers.

recommendations using indirect evidence from RCTs evaluating the effect of analgesics on postoperative pain after tooth extractions (discussed above) ([Appendix 5](#) and [eTables 1 and 2](#) available online at the end of this article).

Local anesthetics for the initial and extended temporary management of toothache

The panel failed to find direct evidence regarding the effect of local anesthetics on the temporary management of symptomatic pulpitis or periapical disease. The panel decided to inform these recommendations using indirect evidence from RCTs assessing the impact of local anesthetics on postoperative pain after tooth extractions.

Topical anesthetics for the temporary management of toothache

Low certainty evidence suggests that either 10% (2 RCTs) or 20% (3 RCTs) topical benzocaine may increase the proportion of people experiencing a substantial reduction in pain intensity during at least 2 consecutive time points (20-30 minutes) compared with no treatment (placebo vehicle). Moderate certainty evidence indicates that there is probably a negligible benefit of administering 20% benzocaine compared with 10% benzocaine regarding the number of responders at 20 through 30 minutes.⁴³

Remarks

- The panel reminds users that these recommendations only apply to settings in which definitive dental treatment is not immediately available. These interventions are a bridge between the first consultation for acute dental pain and a second consultation for definitive dental treatment. They are not a substitute for or a reason to delay the immediate provision of dental treatment.
- Patients should be instructed to call their health care provider if their pain fails to lessen over time or if the referral to receive definitive dental treatment within 1 through 2 days is not feasible.
- Benzocaine should be applied directly to the affected tooth and the surrounding soft tissue (gingiva).

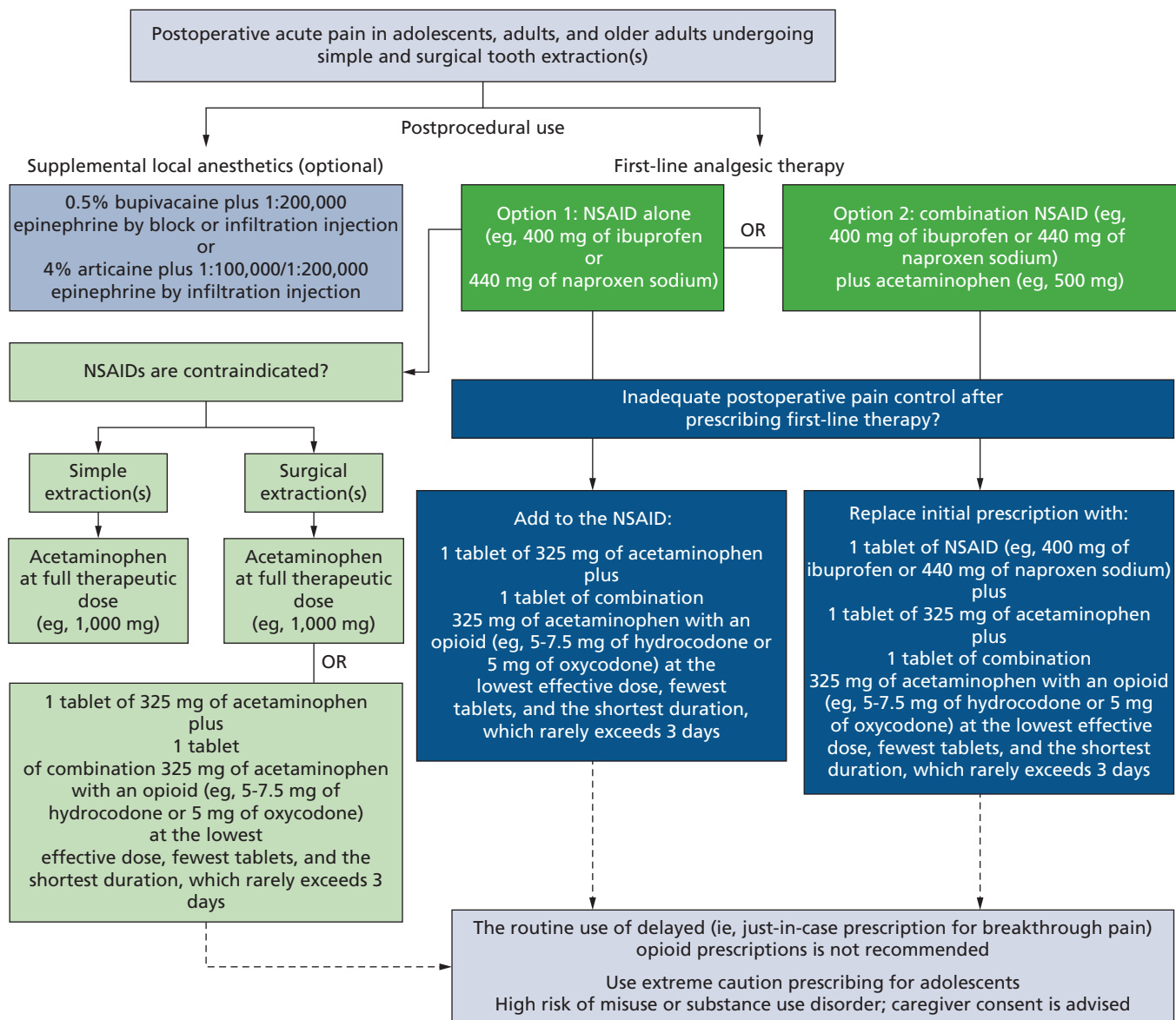


Figure 1. Clinical pathway for the pharmacologic management of acute dental pain: postoperative pain after simple and surgical tooth extraction(s) in adolescents (aged 12- < 17 years), adults (aged 17- < 65 years), and older adults (≥ 65 years). NSAID: Nonsteroidal anti-inflammatory drug.

General remarks applicable to the pharmacologic management of postoperative pain after simple and surgical tooth extraction(s) and temporary management of toothache

- In the limited circumstances when opioids are prescribed, apply shared decision making with and obtain informed consent from the patient (or in the case of minors, the parent or guardian) covering potential opioid risks (including physiological dependence, risk of substance use disorder, opioid misuse, respiratory depression, adverse effects on driving and operating machinery). This is particularly critical in adolescents and young adults who are at increased risk of experiencing subsequent misuse and opioid use disorder even after a single prescription.
- The FDA stated in a Drug Safety Communication in 2020 that “For all patients who are prescribed opioid pain relievers, health care professionals should discuss the availability of naloxone, and consider prescribing it to patients who are at increased risk of opioid overdose, such as patients who are also using benzodiazepines or other medicines that depress the central nervous system, who have a history of opioid use disorder (OUD), or who have experienced a previous opioid overdose. Health care professionals should also consider prescribing naloxone if the patient has household members, including children, or other close contacts at risk for accidental ingestion or opioid overdose.”⁵³

Box 2. Recommendations and good practice statements for the temporary pharmacologic management of acute dental pain: toothache (symptomatic pulpitis [ie, reversible or symptomatic irreversible pulpitis with or without symptomatic apical periodontitis] or pulp necrosis with symptomatic apical periodontitis or acute apical abscess) in adolescents, adults, and older adults.

Recommendations

1. For the temporary management* of toothache[†] before definitive dental treatment in adolescents, adults, and older adults,[‡] the panel suggests the use of a short-acting local anesthetic (eg, 2% lidocaine plus 1:100,000 epinephrine or 4% articaine plus 1:100,000 epinephrine) for immediate pain relief (conditional, very low certainty).
2. For the temporary management* of toothache[†] before definitive dental treatment in adolescents, adults, and older adults,[‡] the panel recommends the postvisit use of nonopioid analgesics[§] as first-line therapy instead of opioid analgesics (conditional, low certainty).
 - 2.1. For the temporary management* of toothache,[†] the panel suggests initiating postvisit pain management using a nonsteroidal anti-inflammatory drug (NSAID) alone (eg, 400 mg of ibuprofen or 440 mg of naproxen sodium) or in combination with acetaminophen (eg, 500 mg) (conditional, low certainty).
 - 2.2. In the rare instances when postvisit pain control using NSAIDs alone proved inadequate, the panel suggests the addition to the previous first-line therapy (ie, NSAID) prescription of 325 mg of acetaminophen plus a combination of 325 mg of acetaminophen with an opioid^{¶, #, **} (eg, 5-7.5 mg of hydrocodone or 5 mg of oxycodone) at the lowest effective dose, fewest tablets, and the shortest duration, which rarely exceeds 3 days (conditional, low certainty).
 - 2.3. In the rare instances when postvisit pain control using NSAIDs in combination with acetaminophen (eg, 500 mg) proved inadequate, the panel suggests replacing the initial first-line therapy prescription with an NSAID (eg, 400 mg of ibuprofen or 440 mg of naproxen sodium) and 325 mg of acetaminophen plus a combination of 325 mg of acetaminophen with an opioid^{¶, #, **} (eg, 5-7.5 mg of hydrocodone or 5 mg of oxycodone). The opioid prescription should consider the lowest effective dose, fewest tablets, and the shortest duration, which rarely exceeds 3 days (conditional, low certainty).
 - 2.4. When NSAIDs are contraindicated,^{††} the panel suggests the postvisit use of acetaminophen alone at full therapeutic dose (eg, 1,000 mg) or 325 mg of acetaminophen plus a combination of 325 mg of acetaminophen with an opioid^{¶, #, **} (eg, 5-7.5 mg of hydrocodone or 5 mg of oxycodone) at the lowest effective dose, fewest tablets, and the shortest duration, which rarely exceeds 3 days (conditional, low certainty).
3. For the extended^{‡‡} temporary management* of toothache[†] before definitive dental treatment in adolescents, adults, and older adults,[‡] the panel suggests the supplemental use of 0.5% bupivacaine plus 1:200,000 epinephrine by block or infiltration injection or 4% articaine plus 1:100,000/1:200,000 epinephrine by infiltration injection (conditional, very low certainty).

* These recommendations are applicable only to settings in which definitive dental treatment is not available. Definitive dental treatment includes pulpectomy, nonsurgical root canal treatment, incision for drainage of abscess, and tooth extraction. Patients should be instructed to call if their pain fails to lessen over time or to call if the referral to receive definitive dental treatment within 2 through 3 days is not possible. † Toothache means symptomatic pulpitis (ie, reversible or symptomatic irreversible pulpitis with or without symptomatic apical periodontitis) or pulp necrosis with symptomatic apical periodontitis or acute apical abscess. ‡ The panel defined the following age ranges: adolescents (aged 12- < 17 years), adults (aged 17- < 65 years), and older adults (≥ 65 years). § To minimize adverse effects, analgesic prescriptions should follow the principle of minimum effective dosage to achieve pain relief. The maximum daily dose is 2,400 mg of ibuprofen, 1,100 mg of naproxen sodium, and 4,000 mg of acetaminophen. ¶ This option should not be offered to patients taking gabapentinoids and central nervous system active medications (eg, benzodiazepines, antidepressants, anticonvulsants, and narcotics) or patients already taking opioids for other medical reasons. # When opioids are prescribed, clinicians should obtain informed consent from the patient (or the parent or guardian in the case of minors) with detailed information about potential opioid undesirable effects (eg, physiological dependence, risk of substance misuse, respiratory depression, and adverse effects on driving or operating machinery). This is particularly critical in adolescents and young adults, who are at increased risk of subsequent misuse and substance use disorder even after a single prescription. ** Alert patients about risks of cumulative acetaminophen dose and that acetaminophen plus opioid combination contains both drugs in 1 pill. The total dose of acetaminophen should not exceed 4,000 mg per day. †† “A drug should be contraindicated only in those clinical situations for which the risk from use clearly outweighs any possible therapeutic benefit. Only known hazards, and not theoretical possibilities, can be the basis for a contraindication.”⁵² ‡‡ Blocking or infiltrating using a local anesthetic right before the patient is discharged is 1 additional complementary intervention to provide extended pain relief. This does not replace the need for pain management using analgesics.

Box 2. Continued

4. For the short-term temporary management* of toothache[†] before definitive dental treatment in adolescents, adults, and older adults,[‡] the panel suggests the use of 10% or 20% topical benzocaine compared with not using topical benzocaine (conditional, low certainty).

Good Practice Statements

- The panel advises clinicians to counsel patients that they should expect some pain and the analgesics should make their pain manageable. The panel also recommends discussing with the patient their past experiences, preferences, and values regarding managing acute dental pain before prescribing.
- The panel reminds users of these recommendations that they only apply to settings in which definitive dental treatment is not immediately available. These pharmacologic strategies will temporarily alleviate dental pain until a referral for definitive dental treatment is in place.
- The panel recommends clinicians thoroughly review the patient's medical and social history (including illicit and recreational drug use), medications, and supplements to avoid overdose and adverse drug-drug interactions.
- To minimize adverse effects, analgesic prescriptions should follow the principle of minimum effective dosage to achieve pain relief and avoid the routine use of delayed (ie, just-in-case prescription for breakthrough pain) opioid prescriptions.
- If an NSAID alone or in combination with acetaminophen fails to provide adequate pain relief, and if opioids are prescribed, counsel patients regarding appropriate storage and disposal.
- The panel recommends clinicians review the state's prescription drug monitoring program when available to determine the coprescribing of other controlled substances (eg, opioids or benzodiazepines). If the patient with acute dental pain is already receiving opioids to manage chronic pain (ie, long-term use of opioids), clinicians should prioritize the use of nonopioid analgesics (ie, first-line analgesic therapy).
- Special care should be taken when prescribing opioids to a patient with a substance use disorder, including communication with patient's other health care providers.

- Advise patients to carefully follow instructions on medication label or prescription for appropriate dosage and frequency. To minimize adverse effects, analgesic prescriptions should follow the principle of minimum effective dosage to achieve pain relief. The maximum daily dose of ibuprofen is 2,400 mg, naproxen sodium is 1,100 mg, and acetaminophen is 4,000 mg.
- The FDA stated in a Drug Safety Communication in 2018 that there was "A new Contraindication to the tramadol label warning against its use in children younger than 18 years to treat pain after surgery to remove the tonsils and/or adenoids."⁵⁴
- The FDA stated in a Drug Safety Communication in 2018 that there was "A new Warning to the drug labels of codeine and tramadol to recommend against their use in adolescents between 12 and 18 years who are obese or have conditions such as obstructive sleep apnea or severe lung disease, which may increase the risk of serious breathing problems."⁵⁴
- The FDA stated in a Drug Safety Communication in 2018 that there was "A strengthened Warning to mothers that breastfeeding is not recommended when taking codeine or tramadol medicines due to the risk of serious adverse reactions in breastfed infants. These can include excess sleepiness, difficulty breastfeeding, or serious breathing problems that could result in death."⁵⁴
- Carefully monitor the total dose of local anesthetics administered, especially when used at the beginning of a surgical procedure or visit as a postoperative strategy to manage acute dental pain after discharge.

DISCUSSION

Implications for practice and policy

The key recommendation from this guideline is that nonopioid medications, particularly NSAIDs alone or in combination with acetaminophen, are first-line therapy for the management of acute dental pain

acetaminophen) and multimodal pain management strategies. The observed efficacy of NSAIDs on postoperative pain consecutive to surgical extraction(s) can be attributed to its nature, mainly driven by inflammation, with prostaglandins playing a key role.⁸ Pain intensity greater than mild to moderate is uncommon 24 through 48 hours after most outpatient dental procedures. After 72 hours, discomfort greater than moderate intensity is rare and may indicate a postoperative infection or other complication requiring an oral examination and appropriate treatment.

The panel urges clinicians to reserve opioid medications for use only after first-line therapy is inadequate and avoid delayed prescriptions (just-in-case approach), which follows similar principles of stewardship presented by the Centers for Disease Control and Prevention's guidance for antibiotics.⁵⁵ If opioids are prescribed, use the lowest effective dose, fewest tablets, and the shortest duration, which rarely exceeds 3 days. The panel also urges policy makers and leaders in oral health care to increase access to oral health care for all, particularly the integration of dental and emergency medical services. This recommendation has 2 components. First, there is a need to reconcile and optimize the referral process from emergency medicine to dental services to ensure appropriate and timely management of toothache, which could mitigate overprescription of opioids and antibiotics. Guidelines from 2019 have recommended against the use of antibiotics for most pulpal and periapical conditions and instead have recommended prioritizing definitive dental treatment.^{56,57} Second, there is a need to increase the intensity of preventive oral health care across all age groups to reduce the risk of caries lesions that can progress to pulpal or periapical disease.

Implications for research

Although the evidence informing the desirable effects of analgesics and local anesthetics was assessed, for many of the outcomes having high to moderate certainty, we found only low and mostly very low certainty evidence regarding adverse effects. Future studies should emphasize the importance of reporting precise estimates for patient-important adverse events by increasing sample size. The studies informing the effect of analgesics for managing postoperative pain included, on average, no more than 150 patients in total. Our analysis of values and preferences suggests that patients may be aware of the potential harms associated with the use of opioids and that their risk tolerance increases as pain intensity increases. To our knowledge, this is the first guideline proposing that acute dental pain management decisions are suitable for shared decision making. We urge researchers to investigate further how clinician concerns and patients' values can combine to produce the most optimal health outcomes while developing, testing, and improving research methods to test this approach.

CONCLUSIONS

Nonopioid medications represent first-line therapy when managing acute dental pain consecutive to tooth extraction(s) (simple, surgical) and the temporary management of toothache. There is a beneficial net balance in favor of using nonopioid medications compared with prescribing opioid medications. Clinicians and patients should discuss and define a pain management plan that fits values and preferences (ie, shared decision making) in alignment with the expected pain intensity and minimize the risk of undesirable outcomes related to opioid medications.

DISCLOSURES

Dr. Aghaloo is the associate editor for *Journal of Oral and Maxillofacial Surgery*. Within the past 10 years, Dr. Dionne has received compensation in the form of honoraria or travel funds for serving as a speaker or consultant for management of acute dental pain. Within the past 10 years, Dr. Gordon has received research funding related to acute dental pain; funds were paid to the affiliated universities in the form of grants and contracts. Over the past 10 years, Dr. Hersh on behalf of the Trustees of the University of Pennsylvania has received funding from Charleston Laboratories, Pfizer Consumer Healthcare, Cetylite, Bayer Healthcare, the Penn Medicine Center of Precision Medicine, and the National Institutes of Health as well as consulting fees from Johnson & Johnson and Bayer Healthcare. Dr. Schwartz is the immediate past president of American Association of Oral and Maxillofacial Surgeons and president of the American Dental Society of Anesthesiology. None of the other authors reported any disclosures. ■

SUPPLEMENTAL DATA

Supplemental data related to this article can be found at: <http://doi.org/10.1016/j.adaj.2023.10.009>.

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These guidelines are intended to help inform clinical decision making by prescribers and patients. They are not intended to be used for the purposes of restricting, limiting, delaying, or denying coverage for or access to a prescription issued for a legitimate medical purpose by an individual practitioner acting in the usual course of professional practice.

The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the United States government. The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

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56. Lockhart PB, Tampi MP, Abt E, et al. Evidence-based clinical practice guideline on antibiotic use for the urgent management of pulpal- and periapical-related dental pain and intraoral swelling: a report from the American Dental Association. *JADA*. 2019;150(11):906-921.e12.
57. Tampi MP, Pilcher L, Urquhart O, et al. Antibiotics for the urgent management of symptomatic irreversible pulpitis, symptomatic apical periodontitis, and localized acute apical abscess: systematic review and meta-analysis—a report of the American Dental Association. *JADA*. 2019;150(12):e179-e216.

APPENDIX 1. DESCRIPTION OF EXISTING GUIDANCE ON OPIOIDS FOR ACUTE DENTAL PAIN

Several US institutions have produced guidance on the prescription of opioids for managing acute dental pain. Some address opioid prescribing in general. For example, the state departments of health in Washington,²⁰ Utah,²¹ Ohio,²² Oklahoma,²³ and Pennsylvania²⁴; the New York City Department of Health and Mental Hygiene²⁵; and Massachusetts General Hospital²⁶ have had general opioid prescribing guidelines in place for many years and, in some cases, more than a decade. State policy interventions have been shown to be associated with reductions in prescription opioid misuse and death.²⁷⁻²⁹ In 2016, the Centers for Disease Control and Prevention published a guideline addressing opioid prescriptions for chronic pain, in which recommendation no. 6 addressed acute pain.³⁰ In the same year, the American Dental Association House of Delegates adopted a statement on the use of opioids.³¹ In 2017, the American Association of Oral and Maxillofacial Surgeons developed their recommendations for opioid prescribing.³² In 2018, the American Dental Association Board of Trustees formulated an interim policy, now final, on opioid prescribing.³³ Also, the Indian Health Service Division of Oral Health published recommendations.³⁴ In 2019, the Virginia Board of Dentistry included guidance in their regulations governing the practice of dentistry.³⁵ In 2020, the Veterans Health Administration also developed guidelines.³⁶ In 2021, the Association of State and Territorial Dental Directors published a policy statement.³⁷ Academic institutions have also developed guidance on the use of opioids to manage acute pain (eg, dental schools at the University of Minnesota³⁸ and the University of Pittsburgh³⁹).

APPENDIX 2. ADDITIONAL DESCRIPTION OF THE METHODS

Selection of the panel and methodological team

The panel was selected following internal processes established by the American Dental Association Science and Research Institute as described in the grant application that funded the development of this guideline. The methodological team was selected by the principal investigators (A.C.-L., D.E.P.) of this same grant, who have extensive experience in guideline development and the composition of skills needed to execute this project.

Management of conflict of interest

In November 2020, at the beginning of the project, panel members filled out forms detailing any potential financial, intellectual, or institutional conflicts of interest (COI). The methodological team, a subcommittee of the American Dental Association's Council on Scientific Affairs, and officers at the US Food and Drug Administration reviewed the forms to identify any disqualifying COI.^{e1} Panel members disclosed and updated the COI at the beginning of every meeting. If a panel member had a conflict related to a recommendation statement, this panel member was asked to abstain from the discussion. On several occasions, panel members who authored randomized controlled trials included in the systematic reviews used to inform the benefits and harms of interventions of interest abstained from discussions and the process of formulating that particular recommendation.

Certainty of the evidence assessment

We used the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach to assess the certainty of the evidence.⁴¹ In GRADE, the certainty of the evidence from randomized controlled trials starts at high and observational studies at low certainty. The certainty can decrease to moderate, low, or very low due to serious or very serious issues of indirectness, imprecision, risk of bias, publication bias, or inconsistency. Conversely, the certainty can also increase if any of the following scenarios is identified: large magnitude of effect, dose-response gradient, or all plausible residual confounding may be working to reduce or decrease a treatment effect if no effect was observed.

The panel adhered to the GRADE Evidence-to-Decision (EtD) framework,⁴⁸ considering these factors when formulating recommendations: desirable effects, undesirable effects, certainty of the evidence, net balance between desirable and undesirable effects, patient's values and preferences, acceptability, feasibility, resources required, and equity. The methodologists (A.C.-L., O.U., A.M., S.P., L.P., M.T.) used the EtD tables in the software program GRADEpro to facilitate the process for formulating recommendations informed by pairwise meta-analyses and piloted an EtD table developed by the GRADE working group for recommendations informed by network meta-analyses.

Updating process

The American Dental Association Forsyth Institute will update guidelines every 5 years or whenever newly published evidence could result in a change in the direction or strength of recommendations. Updates will be posted on the website ADA.org/painrelief.

APPENDIX 3. LIST OF STAKEHOLDER ORGANIZATIONS CONTACTED AND RESPONSES

1. Academy of General Dentistry*
2. ADA Council on Advocacy for Access and Prevention*
3. Agency of Healthcare and Research Quality*
4. American Academy of Ambulatory Care Nursing
5. American Academy of Oral Medicine*
6. American Academy of Orofacial Pain
7. American Academy of Pain Medicine
8. American Academy of Periodontology*
9. American Academy of Physician Assistants*
10. American Association for Dental, Oral, and Craniofacial Research
11. American Association of Endodontics*
12. American Association of Nurse Practitioners*
13. American College of Clinical Pharmacy*
14. American College of Physicians*
15. American Dental Association Council on Dental Benefit Programs*
16. American Dental Association Council on Dental Practice*
17. American Dental Education Association*
18. American Dental Hygienists' Association*
19. American Geriatrics Society*
20. American Public Health Association*
21. American Society of Dentist Anesthesiologists*
22. Association of State and Territorial Dental Directors*
23. Emergency Nurses Association*
24. Health Resources and Services Administration*
25. Indian Health Services*
26. National Academy of Medicine Action Collaborative on Countering the U.S. Opioid Epidemic*
27. National Institute of Dental and Craniofacial Research*
28. National Network for Oral Health Access*
29. National Rural Health Association/North Carolina Oral Health*
30. Special Care Dentistry Association—Geriatrics Council*
31. Veterans Health Administration*

*Organization from whom input was obtained.

APPENDIX 4. PATIENTS' VALUES AND PREFERENCES STATEMENT

This statement is based on the primary study by Dawson and colleagues.⁴⁷

Most people identify 2 possible outcomes as critical to their decision making when considering how they would manage acute dental pain:

1. pain relief
2. the possibility of substance use disorder or misuse of pain relief medicines

In addition, when considering different pain levels (mild, moderate to severe, severe to very severe), most people indicate that, as pain levels increase, they find it critical or important to have available additional medication to relieve pain (rescue analgesia). In situations of mild and moderate to severe pain, many people also identify the possibility of experiencing dizziness, drowsiness, and nausea as important but not critical to their decision making.

When considering how to manage acute dental pain, a few people will identify outcomes such as constipation, headache, slowed movement, upset stomach, or cost as critical to their decision making. Some people will indicate these outcomes are important but not critical, whereas some will identify these outcomes as not important to their decision making. For many people, the expected duration of acute dental pain (2-3 days) is an important consideration. People anticipate that any level of acute dental pain will limit their ability to perform (or their interest in performing) daily activities. As a result, people are willing to consider pain relief medication with adverse effects that could reduce their ability to perform certain activities, such as driving.

At all acute dental pain levels, most people maintain a concern about possibly developing a substance use disorder when considering how to manage their pain. As a result, most people prefer to manage any level of acute dental pain with nonopioid pain relief medications. In addition, most people prefer to manage mild and moderate acute dental pain with nonprescription pain relief medications. Nevertheless, for severe and very severe pain levels, most people are willing to consider the use of opioids. In these situations, they will likely prefer a combination of pain relief medications that includes a light use of opioids. Here, too, the duration of pain is significant to people's considerations. Most people do not think it likely that they will abuse or misuse pain relief medications in the span of 2 through 3 days.

For any acute dental pain situation, people value agency when consulting with providers. As a result, people value providers who communicate different options and who communicate options in ways that are sensitive to the patient's specific living circumstances. In relation to this preference for individually tailored pain management options, people identify specific things they will consider when making choices, including concerns about interactions with other medications they may be taking and the importance of understanding possible effects medications may have on women who are pregnant or nursing. Some people also suggest that the lack of dental insurance may be an important consideration; specifically, some people may choose not to seek treatment, may not acquire prescribed pain medications, or may self-medicate with intoxicants (alcohol, marijuana) due to a lack of dental insurance.

APPENDIX 5. ADVERSE EVENTS ASSOCIATED WITH OPIOIDS AFTER DENTAL PROCEDURES

We identified 5 observational studies providing evidence regarding the impact of opioid prescriptions from dental providers on serious adverse effects (eg, persistent opioid use, substance use disorder, overdose, and naloxone use).

1. Harbaugh and colleagues⁹ determined the association between filling a prescription for opioids after a third-molar extraction and the persistent use of prescription opioid medications. The study suggests that patients (aged 13-30 years) undergoing third-molar extraction and filling a perioperative opioid prescription (≥ 1 opioid prescriptions filled from 7 days before through 3 days after the procedure) was associated with an increased risk of 0.8% for having persistent opioid use (≥ 1 opioid prescriptions filled anywhere from 4 days through 90 days and 91 days through 365 days after the procedure) and a 1.6% increased risk of receiving a diagnosis of a substance use disorder than patients undergoing a third-molar extraction but not filling an opioid prescription (low certainty).
2. The purpose of the cohort study by Schroeder and colleagues¹⁰ was "to examine the association between index dental opioid prescriptions from dental clinicians for opioid-naïve adolescents and young adults in 2015 and new persistent use and subsequent diagnoses of abuse in this population." The study suggests that adolescents and young adults who received an opioid prescription from a dental clinician had a 2.5% increased risk of filling more than 1 opioid prescription from 90 days through 365 days after the initial prescription and a 5.3% increased risk of having an opioid abuse diagnosis (International Classification of Diseases-9 or -10) within 90 days after the initial prescription compared with those not having a prescription (low certainty).
3. The purpose of the study by Chua and colleagues^{e2} was to determine the association between providing an opioid prescription after a dental procedure and the risk of the patient and their family members reporting an overdose event within 90 days. The study suggests that patients (ie, those aged 13-64 years) undergoing a dental procedure and receiving an opioid prescription showed an increased risk of reporting an opioid overdose event within 90 days of 0.036% (3.6 more per 10,000 procedures) than patients who had a dental procedure but did not receive an

opioid prescription. Family members of patients receiving an opioid prescription linked to a dental procedure had an increased risk of having an opioid overdose event of 0.007% (0.7 per 10,000 procedures) than family members of patients who did not receive an opioid prescription (low certainty).

4. Khouja and colleagues^{e3} evaluated the risk of long-term opioid use among opioid-naïve Pennsylvania Medicaid beneficiaries filling an initial opioid prescription received from a dentist from 7 days before through 3 days after an index dental procedure compared with those who did not fill a prescription. The authors used data from Pennsylvania Medicaid beneficiaries aged 12 through 64 years who underwent a dental procedure from January 1, 2012, through December 31, 2017, and had no history of opioid prescriptions within 180 days before the index dental procedure. Authors stratified their analysis of the association between filling an initial opioid prescription and long-term opioid use by the anticipated pain associated with the index dental procedure performed. Long-term opioid use was defined as “1 or more opioid prescriptions filled 91 through 365 days after an index procedure” by any medical provider (ie, dental and non-dental providers). Anticipated pain levels associated with dental procedures were categorized as low (eg, diagnostic and preventive), moderate (eg, endodontics), or high (eg, oral maxillofacial procedures). Regardless of the anticipated pain level associated with the dental procedure, patients who filled an opioid prescription after a dental procedure probably have an increased risk of developing long-term opioid use compared with those who did not fill an opioid prescription after a dental procedure (moderate certainty). In addition, adults who filled an opioid prescription after a dental procedure, regardless of the pain level associated with their dental procedure, probably have an increased risk of developing long-term opioid use compared with adolescents (moderate certainty) (eTable 1).
5. Khouja and colleagues¹¹ assessed the risk of long-term persistent opioid use and opioid-related adverse outcomes in patients receiving an opioid prescription from a dentist and evaluated how often these outcomes occurred between opioid prescriptions within or exceeding dosage recommendations. The authors used a subset of IBM MarketScan data of patients 18 years and older with a dental visit and the same-day opioid prescription (in the form of a tablet or capsule) from January 1, 2011, through December 31, 2018, to conduct their analysis. Outcomes of interest were long-term persistent opioid use and opioid-related adverse outcomes. Long-term persistent opioid use was defined as “at least 1 opioid fill 91 to 365 days postindex date.” Opioid-related adverse outcomes were defined as “an occurrence of an opioid-related adverse outcome within 30 days of the index date, defined as any occurrence of all-cause (including opioid specific) hospitalization, emergency department (ED) visits, new substance use disorder (SUD) diagnosis, naloxone prescription or administration, or inpatient mortality.” Low certainty evidence suggests that adults who received and filled an opioid prescription during a dental visit that exceeded the recommended 120 morphine milligram equivalents (MME) may have a slightly higher risk of long-term persistent opioid use than and approximately the same risk of adverse outcomes as adults who received and filled an opioid prescription during a dental visit that was within the recommended MME. Among adults who received and filled an opioid prescription during a dental visit that exceeded the recommended 120 MME, those who underwent a dental procedure associated with mild pain probably have a decreased risk of long-term persistent opioid use than those who underwent a dental procedure associated with moderate and severe pain (moderate certainty). Moderate certainty evidence suggests that of people who received and filled an opioid prescription during a dental visit that exceeded the recommended 120 MME, adults aged 18 through 34 years probably have a decreased risk of long-term persistent opioid use compared with adults 35 years and older. Furthermore, among adults who received and filled an opioid prescription during a dental visit that exceeded the recommended 120 MME, those who underwent a dental procedure associated with mild pain may have an increased risk of experiencing adverse outcomes than those who underwent a dental procedure associated with moderate pain and a decreased risk of experiencing adverse outcome than those who underwent a dental procedure associated with severe pain (low certainty). Low certainty evidence suggests that of people who received and filled an opioid prescription during a dental visit that exceeded the recommended 120 MME, adults aged 18 through 34 years may have an increased risk of experiencing adverse outcomes compared to adults 35 through 65 years and older (eTable 2).

e1. Alhazzani W, Lewis K, Jaeschke R, et al. Conflicts of interest disclosure forms and management in critical care clinical practice guidelines. *Intensive Care Med.* 2018;44(10):1691-1698.

e2. Chua KP, Kenney BC, Waljee JF, Brummett CM, Nalliah RP. Dental opioid prescriptions and overdose risk in patients and their families. *Am J Prev Med.* 2021;61(2):165-173.

e3. Khouja T, Moore PA, Yabes JG, Weyant RJ, Donohue JM. Initial opioid prescribing and subsequent opioid use after dental procedures among opioid-naïve patients in Pennsylvania Medicaid, 2012 through 2017. *JADA.* 2022;153(6):511-520.e13.

e4. Guyatt GH, Oxman AD, Vist GE, et al.; GRADE Working Group. GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. *BMJ.* 2008;336(7650):924-926. doi:10.1136/bmj.39489.470347.AD

eTable 1. Predicted probabilities (absolute effects) (95% CI) and certainty of the evidence for long-term use of opioids in Pennsylvania Medicaid beneficiaries.*,†,‡

INDEX DENTAL PROCEDURES, NO.	INITIAL OPIOID FILL?	PAIN LEVEL OF PROCEDURE [§]	EXPOSURE	AGE, Y	PREDICTED PROBABILITY, % (95% CI)	CERTAINTY OF THE EVIDENCE, GRADING OF RECOMMENDATIONS, ASSESSMENT, DEVELOPMENT AND EVALUATION ^{e4}	IMPORTANCE
1,175,850	No [¶]	Low Moderate High	Not filling an initial opioid prescription	Not available	1.34 (1.31 to 1.36) 1.88 (1.68 to 2.08) 3.47 (3.40 to 3.54)	Moderate [#]	Critical
169,528	Yes**	Low Moderate High	Filling an initial opioid prescription	Not available	8.77 (8.46 to 9.10) 8.37 (7.17 to 9.56) 6.82 (6.70 to 6.94)	Moderate [#]	Critical
19,847	Yes	Low	Filling an initial opioid prescription	12-15 16-22 22-29 30-39 40-49 50-59 60-64	0.27 (0.25 to 0.30) 1.58 (1.53 to 1.64) 2.71 (2.61 to 2.81) 2.60 (2.50 to 2.69) 2.34 (2.22 to 2.45) 2.31 (2.17 to 2.44) 2.01 (1.83 to 2.20)	Moderate ^{††}	Important
1,724	Yes	Moderate	Filling an initial opioid prescription	12-15 16-22 22-29 30-39 40-49 50-59 60-64	1.33 (1.00 to 3.03) 2.73 (2.42 to 3.03) 3.23 (2.50 to 3.95) 3.25 (2.34 to 4.16) 3.23 (2.11 to 4.34) 3.76 (2.30 to 5.23) 5.21 (2.50 to 7.92)	Moderate ^{††}	Important
147,939	Yes	High	Filling an initial opioid prescription	12-15 16-22 22-29 30-39 40-49 50-59 60-64	1.62 (1.51 to 1.72) 3.40 (3.27 to 3.52) 6.32 (6.14 to 6.49) 6.25 (6.08 to 6.42) 5.78 (5.58 to 5.99) 5.81 (5.59 to 5.99) 4.89 (4.56 to 5.220)	Moderate ^{††}	Important

* Source: Khouja and colleagues.^{e3} † Population: opioid naïve patients aged 12-64 years who underwent a dental procedure from January 1, 2012, through December 31, 2017 (Pennsylvania Medicaid beneficiaries). Setting: dental and medical settings managing acute dental pain. Exposure: an initial opioid fill (Dental procedures based on low postoperative pain include diagnostic and preventive, restorative, prosthodontic, orthodontic, and adjunctive procedures. Dental procedures based on moderate postoperative pain include endodontics and periodontics. Dental procedures based on high postoperative pain include oral maxillofacial procedures and D9110 palliative [emergency] treatment of dental pain, D9930 treatment of complications [postsurgical].^{e3}) from a dentist within 7 days before through 3 days after an index dental procedure (most commonly prescribed opioid: hydrocodone-acetaminophen [55.94%], acetaminophen-codeine no. 3 [26.31%], oxycodone-acetaminophen [12.93%]). Comparator: no initial opioid fill (no opioid fill indicates the patient did not fill an opioid even if one was prescribed by the dentist) from a dentist within 7 days before through 3 days after an index dental procedure. ‡ Long-term opioid use is defined as “1 or more opioid prescriptions filled 91 through 365 days after an index procedure.”^{e3} Long-term opioid prescription fills could have been received from dental and nondental providers. § Dental procedures based on low postoperative pain include diagnostic and preventive, restorative, prosthodontic, orthodontic, and adjunctive procedures. Dental procedures based on moderate postoperative pain include endodontics and periodontics. Dental procedures based on high postoperative pain include (oral maxillofacial procedures and D9110 palliative (emergency) treatment of dental pain, D9930 treatment of complications (postsurgical).^{e3} ¶ No: The patient did not fill an opioid prescription even if one was prescribed by the dentist. # Upgraded due to a large treatment effect based on the difference between groups. ** Yes: An opioid was both prescribed by the dentist and filled by the patient. †† Upgraded due to a dose-response gradient (as age increases, the risk of long-term persistent opioid use increases).

eTable 2. Predicted probabilities (absolute effects) (95% CI) and certainty of the evidence for long-term use of opioids and adverse outcomes in commercially insured US adults.*,[†]

OUTCOME	DENTAL VISITS, NO.	INITIAL OPIOID FILL?	PAIN LEVEL OF EXPOSURE [‡]	EXPOSURE	AGE, Y	PREDICTED PROBABILITY, % (95% CI)	CERTAINTY OF THE EVIDENCE, GRADING OF RECOMMENDATIONS, ASSESSMENT, DEVELOPMENT AND EVALUATION	IMPORTANCE
Long-term Persistent Opioid Use[§]	Not reported	Yes	NA [¶]	Opioid exceeding recommended 120 MME Opioid within recommended 120 MME	> 18	35.78 (34.40 to 37.17) 34.92 (33.58 to 36.29)	Low	Critical
Long-term Persistent Opioid Use	Not reported	Yes	Mild Moderate Severe	Opioid exceeding recommended 120 MME	> 18	32.97 (31.66 to 34.30) 37.66 (36.23 to 39.11) 35.49 (34.12 to 36.88)	Moderate [#]	Critical
Long-term Persistent Opioid Use	Not reported	Yes	NA	Opioid exceeding recommended 120 MME	18-34 35-44 45-54 55-64 > 65	28.95 (27.70 to 30.24) 35.34 (33.94 to 36.78) 37.08 (35.67 to 38.54) 38.26 (36.84 to 39.70) 37.49 (36.02 to 38.99)	Moderate ^{**}	Important
Adverse Outcome^{††}	633,837	Yes	NA	Opioid exceeding recommended 120 MME Opioid within recommended 120 MME	> 18	9.0 (8.00 to 10.23) 9.1 (8.06 to 10.29)	Low	Critical
Adverse Outcome	181,202	Yes	Mild Moderate Severe	Opioid exceeding recommended 120 MME	> 18	8.94 (7.86 to 10.14) 8.20 (7.24 to 9.27) 10.21(9.04 to 11.52)	Low	Critical
Adverse Outcome	181,202	Yes	NA	Opioid exceeding recommended 120 MME	18-34 35-44 45-54 55-64 > 65	10.55 (9.30 to 11.94) 9.51 (8.36 to 10.81) 8.32 (7.30 to 9.45) 7.71 (6.79 to 8.75) 9.56 (8.38 to 10.89)	Low	Important

* Source: Khouja and colleagues.¹¹ † Population: patients older than 18 years with a dental visit and a same-day opioid prescription from January 1, 2011, through December 31, 2018 (not restricted to opioid-naïve patients). Setting: dental settings in the United States managing acute dental pain. Exposure: filling an opioid prescription received during a dental visit that either was within or exceeded the recommended 120 morphine milligram equivalents (MME) (most commonly prescribed opioids: hydrocodone [73.4%], codeine [13.6%], oxycodone [9.8%]). ‡ “The second definition stratified the anticipated pain from post-dental procedure(s) into severe (e.g., bony impaction surgery), moderate (e.g., tooth implants), and [mild] (e.g., routine endodontics).”¹⁹ § Long-term persistent opioid use: “at least 1 opioid fill 91 to 365 days postindex date.”¹¹ ¶ NA: Not available. # Upgraded due to a large treatment effect. This is based on the baseline risk of patients in Khouja and colleagues^{e3} that received an opioid prescription and did not fill it for each pain category (eg, approximately 1 in 100 visits will result in long-term persistent opioid use for procedures with a likelihood of low pain levels). ** Upgraded due to a dose-response gradient (as age increases, the risk of long-term persistent opioid use increases). †† Adverse outcome: “[A]n occurrence of an opioid related adverse outcome within 30 days of the index date, defined as any occurrence of all cause (including opioid specific) hospitalization, emergency department (ED) visits, new substance use disorder (SUD) diagnosis, naloxone prescription or administration, or inpatient mortality.”¹¹

CLINICAL SCENARIO

CLINICAL PRACTICE GUIDELINE QUESTION

Simple Tooth Extractions

In adolescents undergoing a simple tooth extraction (without the need for a flap or osteotomy), which analgesic should we recommend to manage postoperative pain?

In adolescents undergoing a simple tooth extraction (without the need for a flap or osteotomy), should we recommend long- vs short-acting local anesthetics to manage postoperative pain?

In adults undergoing a simple tooth extraction (without the need for a flap or osteotomy), which analgesic should we recommend to manage postoperative pain?

In adults undergoing a simple tooth extraction (without the need for a flap or osteotomy), should we recommend long- vs short-acting local anesthetics to manage postoperative pain?

In older adults undergoing a simple tooth extraction (without the need for a flap or osteotomy), which analgesic should we recommend to manage postoperative pain?

In older adults undergoing a simple tooth extraction (without the need for a flap or osteotomy), should we recommend long- vs short-acting local anesthetics to manage postoperative pain?

Surgical Tooth Extractions

In adolescents undergoing surgical tooth extraction (including impacted mandibular third-molar extractions among others), which analgesic should we recommend to manage postoperative pain?

In adolescents undergoing surgical tooth extraction (including impacted mandibular third-molar extractions among others), should we recommend long- vs short-acting local anesthetics to manage postoperative pain?

In adolescents undergoing surgical tooth extraction (including impacted mandibular third-molar extractions among others), should we recommend corticosteroids vs not using corticosteroids to manage postoperative pain?

In adults undergoing surgical tooth extraction (including impacted mandibular third-molar extractions among others), which analgesic should we recommend to manage postoperative pain?

In adults undergoing surgical tooth extraction (including impacted mandibular third-molar extractions among others), should we recommend long- vs short-acting local anesthetics to manage postoperative pain?

In adults undergoing surgical tooth extraction (including impacted mandibular third-molar extractions among others), should we recommend corticosteroids vs not using corticosteroids to manage postoperative pain?

CLINICAL SCENARIO

Symptomatic Pulpitis (ie, Reversible or Symptomatic Irreversible Pulpitis With or Without Symptomatic Apical Periodontitis) or Pulp Necrosis With Symptomatic Apical Periodontitis or Acute Apical Abscess in Patients Without Immediate Access to Definitive Dental Treatment

CLINICAL PRACTICE GUIDELINE QUESTION

In older adults undergoing surgical tooth extraction (including impacted mandibular third-molar extractions among others), which analgesic should we recommend to manage postoperative pain?

In older adults undergoing surgical tooth extraction (including impacted mandibular third-molar extractions among others), should we recommend long- vs short-acting local anesthetics to manage postoperative pain?

In older adults undergoing surgical tooth extraction (including impacted mandibular third-molar extractions among others), should we recommend corticosteroids vs not using corticosteroids to manage postoperative pain?

In adolescents with symptomatic pulpitis (ie, reversible or symptomatic irreversible pulpitis with or without symptomatic apical periodontitis) or pulp necrosis with symptomatic apical periodontitis or acute apical abscess, which analgesic should we recommend to manage acute pain?

In adolescents with symptomatic pulpitis (ie, reversible or symptomatic irreversible pulpitis with or without symptomatic apical periodontitis) or pulp necrosis with symptomatic apical periodontitis or acute apical abscess, should we recommend long- vs short-acting local anesthetics to manage acute pain?

In adolescents with symptomatic pulpitis (ie, reversible or symptomatic irreversible pulpitis with or without symptomatic apical periodontitis) or pulp necrosis with symptomatic apical periodontitis or acute apical abscess, should we recommend topical benzocaine (10% or 20%) vs not using topical benzocaine to manage acute pain?

In adults with symptomatic pulpitis (ie, reversible or symptomatic irreversible pulpitis with or without symptomatic apical periodontitis) or pulp necrosis with symptomatic apical periodontitis or acute apical abscess, which analgesic should we recommend to manage acute pain?

In adults with symptomatic pulpitis (ie, reversible or symptomatic irreversible pulpitis with or without symptomatic apical periodontitis) or pulp necrosis with symptomatic apical periodontitis or acute apical abscess, should we recommend long- vs short-acting local anesthetics to manage acute pain?

CLINICAL SCENARIO

CLINICAL PRACTICE GUIDELINE QUESTION

In adults with symptomatic pulpitis (ie, reversible or symptomatic irreversible pulpitis with or without symptomatic apical periodontitis) or pulp necrosis with symptomatic apical periodontitis or acute apical abscess, should we recommend topical benzocaine (10% or 20%) vs not using topical benzocaine to manage acute pain?

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In older adults with symptomatic pulpitis (ie, reversible or symptomatic irreversible pulpitis with or without symptomatic apical periodontitis) or pulp necrosis with symptomatic apical periodontitis or acute apical abscess, should we recommend long- vs short-acting local anesthetics to manage acute pain?

In older adults with symptomatic pulpitis (ie, reversible or symptomatic irreversible pulpitis with or without symptomatic apical periodontitis) or pulp necrosis with symptomatic apical periodontitis or acute apical abscess, should we recommend topical benzocaine (10% or 20%) vs not using topical benzocaine to manage acute pain?