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Clinical Report

Alternatives to opioids for acute pain management after dental procedures

A Department of Veterans Affairs consensus paper

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ABSTRACT

Background. Opioid misuse is a widespread public health problem, and opioids are often prescribed in the dental environment. These recommendations provide alternatives to opioids to reduce or eliminate dental procedure—related acute pain.

Methods. A multidisciplinary working group developed these clinical recommendations to specifically address procedure-related acute pain. These recommendations, which are based on published peer-reviewed research and guidelines, include therapies used before, during, and after dental procedures. When evidence is not definitive, the best practices, which are based on experts' consensus, are included. The recommendations are not intended to be exhaustive.

Results. These recommendations are a summary of the evidence and best practices for opioid alternatives to treat acute pain related to dental procedures.

Conclusions. Dental providers should prioritize opioid stewardship when managing procedure-related pain with strategies such as thorough preprocedure pain assessment, minimally invasive techniques, preemptive analgesia, intraprocedure pain management, and appropriately selected postprocedure pharmacologic therapy.

Practical Implications. These recommendations are a concise resource for clinical providers. It is important to address patients' procedure-related pain, using nonopioids whenever possible. Alternatives are outlined, allowing providers to make informed decisions.

Key Words. Analgesics; oral health care; dentistry; drug abuse; pain; postoperative pain.

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Immediate-release opioids are some of the most frequently abused prescription drugs.[1] Dentists are top prescribers of these drugs, although the rate has dropped from 15.5% in the 1990s to 8.6% in 2017.[2-4] Opioid prescribing decreased steadily from 2010 through 2015, when opioid misuse and related deaths began to rise.[3] In 2015, the US Department of Health and Human Services reported 12.5 million people misused prescription opioids and more than 15,000 deaths were attributed to overdosing on prescribed opioids.[5]

There are multiple factors to consider when addressing postprocedure-related dental pain (Figure 1). Pain management begins with first recognizing the potential for pain, which the provider should discuss with the patient preoperatively. Communication, traditional analgesics, and adjunctive modalities are all pain management tools available to dental providers. If pain management is unexpectedly difficult, alternative diagnoses or secondary pain relief should be considered.

The Department of Veterans Affairs developed these clinical recommendations to provide pain management strategies for acute pain after dental procedures, minimize the use of opioids, and reduce variation in clinical practice. The recommendations specifically address procedure-related acute pain, including all therapies used before, during, and after a dental procedure to reduce or eliminate pain. These recommendations were developed by a multidisciplinary team of Department

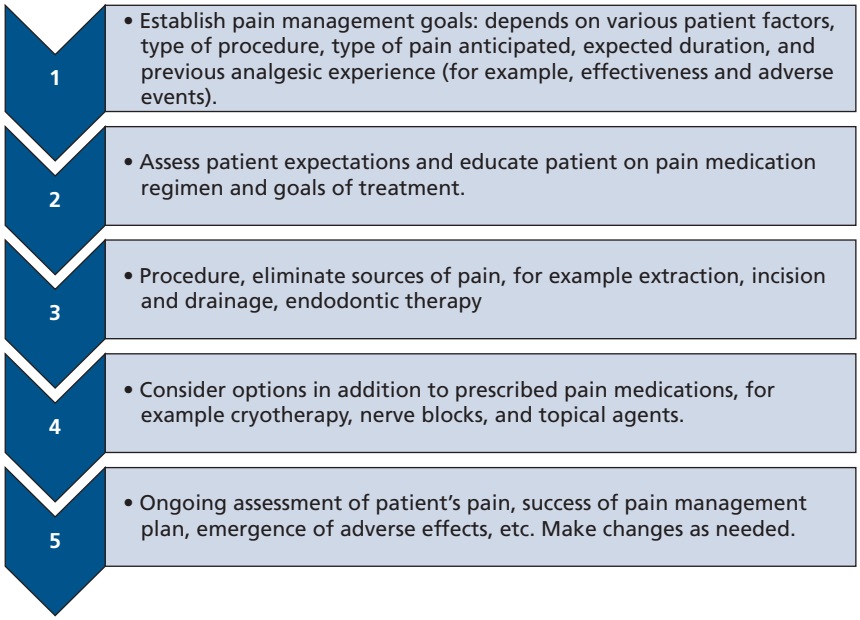

Figure 1. Steps for addressing postprocedure-related pain.

of Veterans Affairs dental providers and then evaluated by 3 external reviewers. They are based on peer-reviewed research and previously published guidelines, when available, and best practice guidance based on expert consensus, when evidence is not definitive. They are intended to be used by dentists in outpatient settings but can be a resource for other health care professionals who manage dental procedure—related pain. These recommendations are not intended to be exhaustive. For situations in which there is concern about complex coexisting medical issues, abuse, or inability to meet the pain management expectations of a patient, providers should consult with the patient's primary care physician or a pain management specialist.

RECOMMENDATIONS

Preprocedure

Patient Assessment

Understanding the patient's history of pain management and opioid use is critical to optimal pain management. Experience with opioids must be discussed preoperatively. A checklist, as shown in Table 1, helps providers review all pertinent preprocedure information.

Assess Preoperative Pain and Pain Management Education

It is important for providers and patients to understand both preprocedure- and expected post-procedure-related pain levels. For example, the pain from a dental problem can be relieved with treatment, but there might be residual pain from the treatment itself or from the healing process. Education about these distinctions and expectations can reduce patients' pain-related anxiety. Patients should understand that acute pain management strategies are focused on procedure-related pain and not chronic general pain.

A pain rating scale (Table 1) can be used to explain the usual and expected pain from a particular procedure and realistically teach the patient what to expect for their comfort level at various times in the healing process.[6-8]

Shared Decision Making

The preprocedure assessment should result in shared decision making between the patient and provider about how postoperative pain will be managed. Patients should understand the level of pain expected from the procedure and the usual medication protocol. In turn, providers should consider any findings that affect the standard or usual protocol and share these with the patient.

ABBREVIATION KEY

APAP: Acetaminophen.
GI: Gastrointestinal.
NSAID: Nonsteroidal anti-inflammatory drug.
OTC: Over the counter.
po: Per os (by mouth).
prn: Pro re nata (as needed).
q: Quaque (every).

Table 1. Preprocedure pain assessment checklist.*

Evaluate Medical Diagnoses That Would Affect Patient's Postprocedural Acute Pain	☐ Medical diagnosis that might increase postprocedural acute pain:
Evaluate Current Medications for Potential Adverse Drug Interactions	☐ Potential drug interactions noted:
Evaluate Psychiatric Diagnoses That Would Affect Patient's Post procedural Acute Pain	☐ Mental health diagnosis thatmight increase acute pain:
Current or Past Abuse of Drugs or Alcohol	Drug abuse (other than opioids): ☐ Current ☐ Past Opioid abuse: ☐ Current ☐ Past Alcohol abuse: ☐ Current ☐ Past
Use of Opioids for Chronic Pain Management	☐ Current If current, list type and dosage: ☐ Past
Provider Responsible for Pain Contract or Chronic Pain Management	☐ Provider and contact information: OR ☐ NA†
Does the Patient Have Any Other Pain Management Strategies They Are Currently Using (For Example, Nonmedication Strategies or Daily OTC‡Medications)?	☐ Nonmedication strategies patient uses for chronic pain control: ☐ Current OTC medication strategies patient uses for chronic pain control:
Preoperative Dental Pain Score (Use Pain Numeric Rating Scale)	Score: 0 1 2 3 4 5 6 7 8 9 10 No pain Worst pain imaginable
Preoperative General Pain Score (Use Pain Numeric Rating Scale)	Score: 0 1 2 3 4 5 6 7 8 9 10 No pain Worst pain imaginable
Preoperative Pain Management Education Completed With Patient	☐ Yes ☐ No

* Document positive findings in column 2.
† NA: Not applicable.
‡ OTC: Over-the-counter.

Intraprocedure

Preemptive Pain Medication

Nonsteroidal anti-inflammatory drugs (NSAIDs) can be given before the surgical incision and timed so that the maximum plasma concentration of the drug is reached at the beginning of the procedure, for example, 400 through 600 mg of ibuprofen taken 30 minutes before the appointment. This potentially reduces the release of the inflammatory mediators related to postprocedure-related dental pain.[9]

Corticosteroids

Corticosteroids limit the accumulation of inflammatory mediators, reduce fluid transudation and edema, and help prevent postoperative nausea and vomiting.[10] They also reduce the classic signs of inflammation (that is, erythema, swelling, pain, and heat), spontaneous discharge from injured nerves, and neuropathic pain. Corticosteroids can have a positive effect on postoperative pain-level intensity from endodontic procedures[11] and third-molar surgery.[12-15]

Corticosteroids can be administered intravenously or orally, both during and after treatment. Intravenous perioperative corticosteroids are used primarily in major maxillofacial surgical procedures, but also before dentoalveolar procedures using intravenous sedation. This reduces the incidence of postoperative nausea and vomiting and postoperative swelling and trismus. Using corticosteroids for routine dental procedures is generally not indicated if there is an expectation of minimal surgical trauma.

Anxiety Management

Managing anxiety helps manage pain during all phases of treatment. Anxious patients expect pain during treatment and feel they have little control.[16] Anxiety management strategies include

educating patients about pain expectations and using nitrous oxide, preoperative anxiolytics, preoperative acupuncture, intravenous sedation, and sometimes general anesthesia.

Common preprocedure benzodiazepines with quick onset and short half-life include 0.25 through 0.5 mg of alprazolam, 0.5 mg of lorazepam, and 0.25 mg of triazolam. Limit oral dosing to a single, lowest effective dose based on the patient's anxiety level and medical history. Provider familiarity with the medication is key to appropriate drug choice; lack of knowledge about a drug's pharmacology becomes a contraindication to its use.[17] Patients must be counseled to avoid other drugs that depress the central nervous system, including alcohol, opioids, sedative hypnotics, anxiolytics, or other benzodiazepines,[18] all of which can exponentially increase sedation and respiratory depression.

Minimizing Tissue Trauma

With this philosophy, the goal of the intervention is to conserve healthy hard and soft tissue. Minimizing tissue trauma can decrease procedure time, inflammation, and postoperative pain, as well as aid in preserving adjacent immunologic functions; for example, surgical extraction via a well-designed and well-executed flap can cause less trauma to soft tissue than a traditional extraction.[19]

Long-Acting Local Anesthetic (Bupivacaine and Liposomal Bupivacaine)

Bupivacaine, a long-acting amide local anesthetic, can be used to manage moderate to severe pain for both procedural anesthesia and postoperative analgesia. In adults, it lasts up to 6 through 8 hours (nerve block) and 5 through 7 hours (local infiltration). Combining 2 preventive regimens—preoperative NSAIDs and long-acting local anesthetic—delays onset of pain, lessens the intensity when it does occur, and minimizes sensitization leading to hyperalgesia from 48 through 72 hours postprocedure.[20]

Liposomal bupivacaine acts as an extended-release bupivacaine with approximately 72 hours of duration. However, data that this anesthetic reduces opioid use are mixed or lacking. It is only indicated for local infiltration and not for regional block. When using liposomal bupivacaine, providers should wait 20 minutes or longer after injecting lidocaine into the same site because, if administered together locally, lidocaine can cause an immediate release of bupivacaine from the liposomal suspension.[21]

For patients who require reliable local anesthesia lasting fewer than 6 through 8 hours, regional block and infiltration techniques with 0.5% bupivacaine with epinephrine might be sufficient. Liposomal bupivacaine can serve as an adjunct for patients who must travel long distances and for those who have a contraindication to using NSAIDs and narcotics.

Postprocedure

The postoperative pain management pyramid is displayed in Figure 2.[22] Most procedures provided in dentistry will be level 1 (mild) pain. As the level of pain increases, so will the need for additional pain management strategies to address the patient's pain, but also for limiting the number of unnecessary opioid prescriptions. Table 2 provides a list of disciplines, the expected pain levels of their related procedures, and recommended management strategies. Table 3 provides sample prescriptions of common pain medications, along with recommended maximum doses and contraindications.

Pharmacologic strategies

NSAIDs

NSAIDs should be considered as first-line drugs for pain management.[28] They suppress inflammation and relieve pain. NSAIDs relieve pain peripherally by means of reversibly inhibiting cyclooxygenases 1 and 2, which inhibits the formation of thromboxanes and prostaglandins.[13,29]

Combining NSAIDs with another drug can be more effective than NSAIDs alone.[13,28,30,31] Authors of 2 systematic reviews found that the combination of 400 mg of ibuprofen plus 1,000 mg of acetaminophen (APAP) was more effective in pain management than opioid-containing medications or other medication combinations.[30,31]

Patients differ in their responses to various NSAIDs.[32] Patients who have an inflammatory condition and a poor response to an NSAID should be assessed to determine adequate dosing and then switched to a different NSAID if adequate pain relief is not achieved.

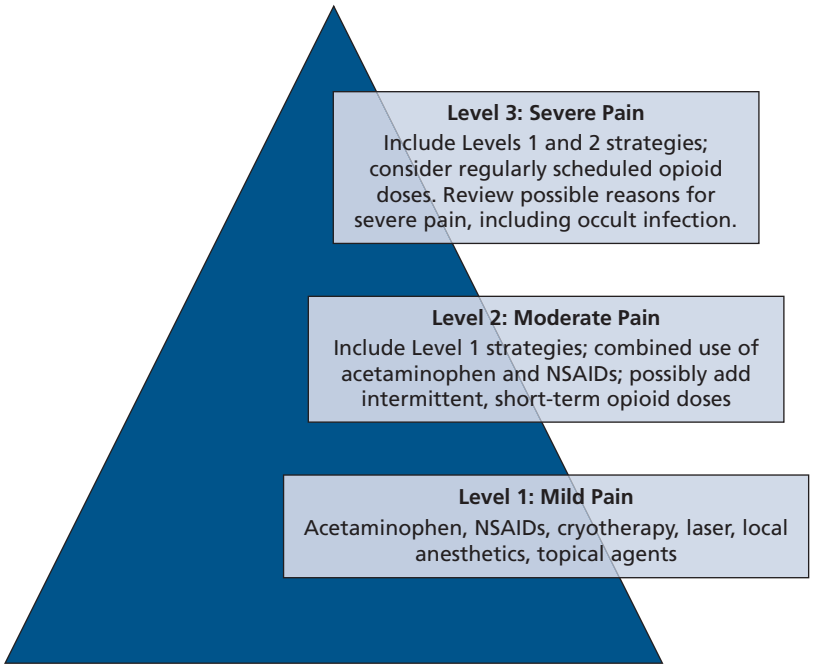

Figure 2. Postoperative pain management pyramid. The provider must anticipate the patient's level of postprocedure-related pain, which will guide the entry point in the pyramid (level 1, 2, or 3). However, the patient's medical history, social history, and pain experiences might require a shift in the entry point. NSAID: Nonsteroidal anti-inflammatory drug. *Adapted with permission of the publisher from Hersh and colleagues.*[22]

Adverse effects of NSAIDs include gastrointestinal (GI) problems and allergic reactions, such as itching and rash. Use caution when prescribing NSAIDs in patients with heavy alcohol use, GI diseases, or liver disease. NSAIDs can negatively affect patients with renal disease and pregnant or lactating women and should be avoided or used in consultation with their physicians. NSAIDs are associated with several drug to drug interactions, including many anticoagulants, some antihypertensives, steroids, selective serotonin reuptake inhibitors, and lithium.[33] There is a moderate increased risk of experiencing subsequent cardiovascular events with long-term NSAID use, and the American Heart Association continues to recommend minimized NSAID use in general.[34,35] Both short-term and long-term NSAID use may be contraindicated in certain patient populations. Use NSAIDs in the lowest dose possible for the shortest duration and review possible drug interactions. A previously noted true allergic reaction to an NSAID is always a contraindication for use.

Dentists seldom prescribe aspirin (acetylsalicylic acid) because other NSAIDs, such as ibuprofen, have lower likelihood of GI adverse effects. Aspirin (650 mg) is comparable with APAP in reducing mild to moderate dental pain.[28,36,37] However, there is a moderate increased risk of experiencing a subsequent cardiovascular event with long-term NSAID use, especially when patients also take aspirin. For patients with cardiovascular disease who take daily aspirin, NSAIDs for acute pain should be used at the lowest dose for the shortest duration. In addition, NSAIDs should be taken at least 30 minutes after the aspirin dose to avoid losing the cardiovascular benefits of daily aspirin therapy.[34,38]

APAP

APAP is a nonopioid drug with central analgesic and antipyretic properties.[39] It manages mild to moderate pain by means of weakly inhibiting cyclooxygenases in peripheral tissues. Dosing of 500 through 600 mg every 4 through 6 hours yields effective analgesia with few adverse effects[40] (maximum dose 3,000 mg/d).[23,24] Its combined use with ibuprofen is more effective in treating acute pain from third-molar extractions than opioid-containing formulations.[30]

The primary risk from using APAP is hepatotoxicity developing in patients with any type of liver disease. A large percentage of acute liver failure can be traced back to APAP use in high-risk patients. APAP is available in combination with other medications, such as hydrocodone and oxycodone; these must be taken into consideration for daily dosing. Certain antiepileptic drugs,

Table 2. Procedures and their anticipated pain levels, with accompanying medication protocols.*

VARIABLE	MILD PAIN	MODERATE PAIN	SEVERE PAIN
Recommended Medication Protocol	400-600 mg q†4-6h‡ of ibuprofen	400-600 mg of ibuprofen and 325-500 mg of acetaminophen q4-6h‡§ Possible addition of 5 mg of hydrocodone, q4-6h for breakthrough pain, 2 d¶	400-600 mg of ibuprofen and 325-500 mg of acetaminophen q4-6h‡§ and 5 mg of hydrocodone or oxycodone q4-6h‡ for breakthrough pain, 3 d¶
Procedures by Practice Type			
Implantology	Single implant placement	Multiple implant placement Implants with bone grafting External sinus lift	–
Oral surgery	Simple extraction Soft-tissue biopsy	Dry socket management Bone biopsy Multiple extractions with or without alveoloplasty Surgical extractions Preprosthetic surgery	Temporomandibular joint surgery Orthognathic surgery Fracture repair Other major maxillofacial surgery
Periodontology	Osseous surgery, single quadrant Scaling and root planning Crown lengthening, single tooth Gingivectomy, single quadrant Soft-tissue surgery, for example, distal proximal wedge, apical positioned flap	Osseous surgery, multiple quadrants with or without bone grafting Limited tissue graft with or without donor site Crown lengthening, multiple teeth Gingivectomy, multiple quadrants	Complex or multiple tissue graft
Endodontics	Uncomplicated root canal Endodontic retreatments	Complex root canal Endodontic retreatment Apicoectomy Endodontic flare-up treatment Acute apical abscess treatment	–
Prosthodontics	Crown preparation Prosthesis-related pain	–	–
General dentistry	Restorations Hygiene procedures (dental prophylaxis)	–	–

* This information applies to patients who do not have a contraindication to ibuprofen and acetaminophen dosing. Use clinical judgment for patients requiring alterations in pain management regimens. † q: Quaque (every). ‡ Not to exceed 3,200 mg of ibuprofen per day. § Not to exceed 3,000 mg of acetaminophen per day.[23,24] ¶ Limit to 3 days based on US Food and Drug Administration guidelines.[25,26]

particularly phenytoin and carbamazepine, and the antitubercular drug isoniazid induce the cytochrome P450 enzyme that converts APAP to a hepatotoxic metabolite; APAP should be used in low doses and with precautions in this context.[41] A noted true allergy to APAP is always a contraindication for use.

Viscous Lidocaine

Topical viscous 2% lidocaine jelly, an amide-type local anesthetic, was found to be of value during and after instrumentation of acute alveolar osteitis. It is easy to syringe into a dry socket after irrigation, yields statistically significant pain relief, and has shown better immediate relief of dry socket pain than traditional eugenol on gauze.[42,43]

Medicated Patches

Medicated patches (for example, diclofenac and lidocaine) for extraoral use bring localized pain relief, primarily for chronic facial pain; however, there is limited evidence on their use for acute procedure-related pain. The principal drugs, diclofenac (NSAID) and lidocaine (local anesthetic), are absorbed directly at the site of application and affect peripheral receptors only, resulting in insignificant serum drug concentrations, few systemic adverse effects, and improved compliance, while also avoiding adverse GI effects, drug interactions, and dose titration. If patches are not available, providers can substitute a layer of medicated ointment or gel directly on the skin at the site of pain and cover with a dressing.

Opioids

Opioids can be clinically efficacious in controlling severe pain but have potential for abuse and addiction because they activate the reward centers in the brain. Opioids can cause sedation and euphoria and depress the brain's respiratory drive and central response to carbon dioxide.[44]

Table 3. Common medications for pain in healthy adults: sample prescriptions, recommended maximum doses, and contraindications.

DRUG	TYPICAL DOSE	MAXIMUM DOSE	CAUTIONS AND CONTRAINDICATIONS*
Nonsteroidal Anti-Inflammatory Drugs			
Ibuprofen			
400 mg	1 tablet po† q‡4h prn§ pain	3,200 mg/d	Multiple drug-to-drug interactions, including anticoagulants, some antihypertensives, steroids, selective serotonin reuptake inhibitors, and lithium Increases risk of experiencing stroke and cardiac failure in patients at high risk due to previous stroke or uncontrolled blood pressure Consider only short-term if taking daily aspirin for cardiovascular disease Caution with: Heavy alcohol use, gastrointestinal disease, liver disease (increased bleeding) Renal disease Asthma Pregnancy Lactation (avoid or use in consultation)
600 mg	1 tablet po q6h prn pain	3,200 mg/d	
800 mg	1 tablet po q8h prn pain	3,200 mg/d	
220 mg of naproxen sodium	1-2 tablets po q12h prn pain[27]	660 mg/d	
25 mg of indomethacin	1-2 tablets po q8h prn pain	200 mg/d	
200 mg of celecoxib¶	1 tablet po q12h prn pain	400 mg/d	
325 mg of aspirin	1-2 tablets q4-6h prn pain	4,000 mg/d	
APAP#			
325 mg	1 tablet q4-6h prn pain	3,000 mg/d	Hepatotoxicity risk with liver disease (chronic or acute) Risk of overprescribing owing to inclusion in many combination medications Some antiseizure and antifungal medications can increase APAP levels
500 mg	1 tablet q4-6h prn pain	3,000 mg/d	Hepatotoxicity risk with liver disease (chronic or acute)
Opioids			
50 mg of tramadol	1 tablet q6h prn pain	400 mg/d	Avoid concurrent use of opioids with benzodiazepines Avoid use in patients with biliary disease or pancreatitis Cautions: Pulmonary disease Epilepsy (increased seizure activity) Medications that can increase opioid levels in the body: Gabapentin Ketoconazole Erythromycin
37.5 mg of tramadol/ 325 mg of APAP	1 tablet q6h prn pain	Do not exceed 400 mg/d of tramadol and 3,000 mg of APAP from any source per day	
5 mg of hydrocodone/ 325 mg of APAP	1 tablet q6h prn pain	Do not exceed 60 mg/d of hydrocodone and 3,000 mg of APAP from any source/d	
5 mg of oxycodone/ 325 mg of APAP	1 tablet q6h prn pain	No maximum oxycodone dose Do not exceed 3,000 mg of APAP from any source per day	
5 mg of oxycodone, plain	1 tablet q6h prn pain	No maximum oxycodone dose	
Medicated Patches			
Diclofenac 1.3% patch (180 mg)	1 patch over affected area q12h prn pain	2 patches per day	May trim patch with scissors to fit over desired area
Lidocaine 5% patch (700 mg)	1 patch over affected area for 12 h, then 12 h off	3 patches per day	May trim patch with scissors to fit over desired area

* Consult clinical drug information software for all drug-drug interactions. † po: Per os (by mouth). ‡ q: Quaque (every). § prn: Pro re nata (as needed). ¶ Do not use in patients with significant cardiovascular disease. # APAP: Acetaminophen.

The most commonly used opioid prescription drugs include codeine, hydrocodone, oxycodone, morphine, hydromorphone, and methadone. Some of these formulations are combined with either APAP or NSAIDs.[45]

When prescribing opioids to manage acute, severe, dental procedure–related pain, review the patient's opioid prescription history through the appropriate state drug monitoring program; carefully consider the shortest duration on the basis of the procedure's complexity[46] (Table 2); and provide options for disposing of unused opioids and encourage patients to do so.[47]

Potential adverse effects of opioids include respiratory depression; drowsiness and sedation; GI problems, including nausea and severe constipation; bradycardia; and hypotension. Specific contraindications with other comorbidities include overlapping opioids with benzodiazepines brings risk of developing severe respiratory depression and possible death; patients with pulmonary problems, including sleep apnea, have increased risk of developing respiratory problems; patients with epilepsy

can see increased seizure activity; opioids should be avoided in patients with biliary disease or pancreatitis; and gabapentin, sometimes used to treat chronic pain, can increase the risk of developing respiratory depression when taken with opioids or other central nervous system depressants.[48]

Other medications that interact with opioids to cause central nervous system depression include zolpidem, ketoconazole, and erythromycin. It is important to assess for drug to drug interactions.

Nonpharmacologic strategies

Cryotherapy

Cold therapy (cryotherapy, that is, applying ice for therapeutic purposes) is a common practice after craniofacial surgery, acute soft-tissue injury, and surgical extraction, helping mitigate the expressive inflammatory response. Although specific evidence-based treatment protocols are not established, researchers have reported a general trend of reducing postoperative pain when cryotherapy is used during third-molar extractions and as a pulpal irrigant during endodontic treatment.[49-52] Results of research on a European cooling and compression system (Hilotherm, Hilotherm) showed that cryotherapy might be a potential pain control modality with limited adverse effects.[53,54]

Medical Marijuana

There are no evidence-based guidelines on the use of medical marijuana for dental or chronic facial pain. Anecdotally, those who claim benefit with medical marijuana often report modest pain relief, dissociation from the pain experience without alteration in pain severity, or modest functional improvement, usually in the form of improved sleep. Evidence to support the increasing use is needed.[55]

Laser

Studies have suggested that low-level laser therapy, also known as photobiomodulation, can enhance wound healing, reduce inflammation, prevent fibrosis, reduce pain, and improve function. It influences different phases of injury resolution.[56] There are many devices that can deliver low-level laser therapy or photobiomodulation, but technique, irradiation, and dosimetric parameters are not standardized, so consistent and uniform outcomes have not been found.

Acupuncture

Acupuncture can help relieve dental pain in several ways and has a good risk to benefit ratio (Box).[57,58,60,61] Battlefield acupuncture is a form of auricular acupuncture that simplifies treatment by means of focusing on 5 points in the ear to provide pain and anxiety relief.[62] It is taught in a 2-day session. Dental boards vary in allowing this as part of dental providers' scope of practice.

Alterations in pain management owing to comorbidities

Anxiety and Mood Disorders

Many patients who have received a diagnosis of anxiety, depression, or mood disorders are treated with psychotropic drugs that can influence pain perception. Antidepressants can augment the opioid pain modulation system and alter the patient's response to pain regimens.[63,64] Within 3 days of NSAID use, the blood levels of lithium, which is used to treat bipolar disorders, can increase substantially, producing lithium toxicity.[65] Consultation with the patient's mental health providers is advised for anyone taking psychotropic medications.

Anticoagulation and Antiplatelet Therapy

NSAIDs increase the international normalized ratio, a serum test used to monitor anticoagulation and antiplatelet therapy, but it might not be observed until 3 days into therapy. Such patients include those with deep vein thrombosis, atrial fibrillation, pulmonary embolism, mechanical heart valves, stroke, ischemic cardiac disease, and cancer. Assess bleeding risk and international normalized ratio for patients taking NSAIDs longer than 3 days.[66,67] APAP-containing drugs can be considered if not otherwise contraindicated. If an NSAID is needed, select the shortest duration and lowest dose, with frequent patient follow-up.[68]

Box. Advantages, disadvantages, and risks associated with acupuncture use in dentistry.[57-59]

ADVANTAGES	DISADVANTAGES	RISKS	USE IN DENTISTRY
Can be used both pre- and postoperatively for pain control	State dental boards vary in the scope of practice for dentists	Perforation of a vital organ, or hemorrhage (rare occurrences)	Nerve pain (neuralgia, especially trigeminal neuralgia, neuropathic pain, or nerve injury)
Can be used for both acute and chronic pain	May not obtain complete analgesia	Masking of other coexisting diseases	Anesthesia of the oral and perioral structures
Minimal adverse reactions	Requires training	Broken needles	Muscle pain or spasm
Nontoxic	May not be effective in patients who are needle-phobic	Syncope (most common)	Temporomandibular joint pain or temporomandibular disorder
No dependency	Can be more time-consuming	—	Dental anxiety

Aspirin-Induced Asthma

In 1 systematic review, most patients with aspirin-induced asthma had cross-sensitivity to ibuprofen (98%), naproxen (100%), and diclofenac (93%).[69] However, only 7% had cross-sensitivity to APAP. Therefore, APAP should be the drug of choice for these patients.

Renal Condition or Previous Organ Transplantation

NSAIDs have direct nephrotoxic effects and should be avoided in patients with advanced kidney disease and organ transplant recipients taking immunosuppressants, such as tacrolimus.[70,71] Most opioids undergo hepatic biotransformation and then renal excretion; therefore, a 50% dose reduction in opioids is advised for patients with chronic kidney disease.[72]

Hepatic Condition

Pain medications can be administered safely short-term in patients with stable liver disease (for example, asymptomatic, no cirrhosis, and no active alcohol use). It is safest to decrease the initial dose and increase the time intervals between subsequent doses. Use caution when prescribing narcotics because hepatic insufficiency negatively affects drug metabolism and elimination.[73] Patients with cirrhosis and ascites can have considerable impairment in drug metabolism. Dental providers are advised to consult with the patient's physicians when devising an analgesic plan for this patient population.[74]

Reduce APAP from all sources to 2 through 3 g/d for patients with liver disease who are not consuming alcohol. For patients who do consume alcohol, limit APAP to less than 3 g/d.[74]

Symptomatic liver disease negatively alters metabolism of NSAIDs. Many NSAIDs are heavily bound to proteins, leading to high levels of circulating drug due to low levels of serum protein. NSAIDs can impair renal function and worsen portal hypertension and cirrhosis. NSAIDs can cause mucosal bleeding in patients with liver disease who have reduced platelet counts and coagulopathy. They might need to be avoided or prescribed in reduced doses for patients with liver disease.[74]

Most opioids are metabolized primarily in the liver. Patients with cirrhosis have decreased drug clearance and possibly increased bioavailability, causing opioid accumulation, especially with repeated dosing. Opioids should be avoided or prescribed in reduced doses for patients with liver disease.[74]

Current or Previous Long-Term Drug or Alcohol Use

A history of drug use must be considered when prescribing acute pain regimens. Substantial evidence supports the association of long-term opioid use with increased postoperative analgesic requirements, mediated by means of higher drug tolerance and opioid-induced hyperalgesia.[75] However, in many cases, acute pain in the patient with addiction is managed the same as for all patients. Severe pain from infections or surgical procedures should not be underestimated. Providers should limit drug quantity and closely follow the patient to prevent relapse in those recovering from addiction. Consultation with a pain management specialist can be helpful. Treatment of pain in this population is often best managed using a single provider who is responsible for writing and renewing all required opioid analgesics. Management strategies can include opioids at the lowest effective dose, use of both long-acting opioids for maintenance and short-acting opioids for breakthrough pain, and remaining alert to signs of opioid tolerance or abuse.[76]

Some patients with opioid use disorder are treated with buprenorphine and their pain management physician should be consulted about the anticipated acute severe pain. Options could include prescribing short-acting, immediate-release opioids or deciding to have the patient stop taking buprenorphine in preparation for the anticipated painful procedure.

Long-term alcohol or drug use can lead to alcohol-related liver disease. Pain management in this group is more challenging with worsening disease due to impaired drug metabolism and reduced protein synthesis. Knowing where a patient is in their recovery process helps manage their acute pain appropriately.

Patients With Chronic Pain on Opioid Contracts

Patients on stable opioid contracts, usually for chronic pain conditions, are followed closely by a primary care provider. Although it is reasonable to prescribe NSAIDs, patients with expected severe pain might require a limited number of additional opioid doses, in consultation with the patient's primary opioid prescriber. Otherwise, these patients risk increasing their regular opioid doses and then running out of their opioids and experiencing early withdrawal symptoms before these prescriptions can be refilled.

CONCLUSIONS

It is a priority for dental providers to appropriately manage procedure-related pain with nonopioids whenever possible. It is critical to conduct a thorough review of the patient's medical and psychiatric history, along with past pain management regimens. Considerations, such as minimally invasive technique, preemptive analgesia, intraprocedure medical management, and postprocedure pharmacologic therapies, can reduce overall discomfort. For patients without medical contraindications, NSAIDs, alone or combined with APAP, can be prescribed for mild to moderate pain, reserving short-term opioid use for those patients whose pain is not controlled with these medications. Consultation with other health care team members is vital to ensure optimal postprocedure pain management in patients with comorbidities or who are on long-term pain regimens. ■

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