

PROCEDURAL C O L U M N

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Dental Pain Relief in the Age of ALTO

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ABSTRACT

The opioid public health crisis necessitates that health care providers seek alternatives to opioid pain control. For patients presenting with dental pain, a dental nerve block provides effective, long-lasting pain relief without the use of opioid pain medications. This article presents the techniques required to safely and effectively administer 3 types of dental nerve blocks, allowing the emergency nurse practitioner to provide effective pain control to patients with dental pain. **Key words:** alternatives to opioids, dental nerve block, nontraumatic dental pain

NONTRAUMATIC DENTAL PAIN (NTDP) is a common presentation in the emergency department (ED), accounting for roughly 1.7 million visits annually (Centers for Disease Control and Prevention, 2016). Common diagnoses for patients with NTDP include toothache, pulpitis, dental caries, gingivitis, and abscess (Sun et al., 2015). Patients who have limited access to dental care may present to the ED with infection or pain (Sun et al., 2015). Traditionally, these patients have largely been treated with antibiotics and pain medication, often an opioid (Dionne, Gordon, & Moore, 2016). In recent years, however, there has

been a push to find alternatives to opioid pain management, as use of opioids has evolved into a public health crisis (U.S. Department of Health and Human Resources, 2017). In 2016, the first alternatives to opioid (ALTO) pain management initiatives were introduced (D'Amore, Traficante, & LaPietra, 2016). The goals of ALTO include avoidance of initiating opioids, limiting prescription amounts, and using a state prescription monitoring database to help inform prescribing practices (D'Amore et al., 2016). In light of these goals, many providers are looking for novel approaches to pain control.

An effective, but often overlooked, strategy for dental pain relief is the dental nerve block. A nerve block with 0.25%–0.5% bupivacaine can offer 6–8 hr of acute pain relief and up to 48 hr of residual pain relief, allowing the patient time to schedule an appointment with a dentist for definitive care. The three regional nerve blocks most useful in the emergency care setting are the inferior alveolar block, the supramanibular block, and the submental

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block (Reed, Malamed, & Fonner, 2012). The inferior alveolar block provides analgesia for the maxillary jaw and the submental block for regions of the mandible (Reed et al., 2012). The suprapariosteal block allows the provider to provide analgesia for an individual tooth (Leighton, 2017). The submental block supplies local anesthesia to the mandible from the second premolar to the incisors, including the gum and the lip (Campo, 2011). Effective use of these blocks can significantly cut down on the need for opiate and even pain medications such as nonsteroidal anti-inflammatory drugs (NSAIDs) (Reed et al., 2012).

The ideal analgesia for ambulatory patients with NTDP provides maximum relief while minimizing systemic effects and the accompanying side effects and risks (Dionne et al., 2016). Dental nerve blocks can provide effective analgesia without the sedating effects of opioids and the rising risk of diversion and abuse (Dionne et al., 2016; Leighton, 2017). Patients who are unable to take NSAIDs due to allergy, cardiovascular risk factors, or gastrointestinal comorbidities can also benefit from a localized dental nerve block (Dionne et al., 2016; Reed et al., 2012). Patients who receive a dental nerve block can often return to normal daily activity immediately after, with rare unpleasant or inconvenient side effects (Leighton, 2017; Reed et al., 2012).

GENERAL CONSIDERATIONS

Before performing a dental block, a careful examination of the oral cavity is necessary to determine the location of the pain and to ensure that the anesthetic will not be injected through an area of infected tissue. Patient allergies and medical history should be verified with the patient, with particular attention to anesthetic allergies. Contraindications for the procedure include infected tissue at the injection site, bleeding disorders, and cardiac abnormalities that require antibiotic prophylaxis such as mechanical valves (Reed et al., 2012). For patients on anticoagulation therapy, an international normalized ratio (INR) should ideally be obtained before proceed-

ing. If the INR is less than 3, there is a low risk of significant hemorrhagic complications (Bajkin & Todorovic, 2010). If the INR cannot be determined, or is over 3, the procedure should not be performed (Bajkin & Todorovic, 2010). Once the determination to proceed with a dental nerve block is made, topical anesthesia may be applied while supplies are gathered to perform the block. After drying the area to be injected with gauze, apply the topical anesthetic on the area to be injected for 3–5 min prior to procedure.

Supplies

The supplies needed to perform dental blocks include a syringe, a 25–27 gauge needle, 5/8–1.5-inch needle, lidocaine or bupivacaine with or without epinephrine, nonsterile gloves, a directable light source, and 2 × 2 gauze. Although dental-type ring syringes are ideal, these are not always readily available in the ED and a standard, 3- to 5-ml syringe may be used. Suction should also be available at the bedside (Reed et al., 2012).

Although either lidocaine or bupivacaine can provide anesthesia, bupivacaine is the preferred agent due to duration of action (Reed et al., 2012). Injection with bupivacaine can provide 2–8 hr of complete pain relief, with residual relief for up to 48 hr, providing the patient time to follow up with a dentist for definitive care (Leighton, 2017). Adding epinephrine if available can decrease bleeding and can increase duration of anesthesia (Leighton, 2017). Lidocaine has a shorter duration of action, providing anesthesia for about 190 min in an inferior alveolar block versus about 440 min for bupivacaine (Becker & Reed, 2006). The maximum dosage of bupivacaine that should be administered is 2 mg/kg. A maximum of 7 mg/kg of lidocaine can be administered (Leighton, 2017).

PROCEDURE

Suprapariosteal Nerve Block

This is the most basic and versatile block to master. This allows for anesthesia of a single

tooth and can be repeated on multiple teeth (Campo, 2011).

1. Once the area to be injected is dried, have the patient relax his or her lips so that the mucobuccal fold can be visualized.
2. Insert the needle into the mucobuccal fold just above the apex of the affected tooth as demonstrated in Figure 1. If bone is contacted, withdraw the needle 1–2 mm.
3. Aspirate. If blood is returned, withdraw the needle completely and reposition. If no blood is returned, inject 1–2 ml of anesthetic and then withdraw the needle.
4. Place gauze over the site and have the patient hold pressure.
5. If anesthesia is not achieved, it may be necessary to inject the palatal (back) side of the tooth (Campo, 2011).

Inferior Alveolar Nerve Block

This block is invaluable for providing analgesia to the molars and, if done properly, can anesthetize all teeth supported by the mandible (Khoury, Mihailidis, Ghabriel, & Townsend, 2011). The needle should contact

the mandible during this procedure. *Because the inferior alveolar blood vessels also occupy this space, aspiration is a critical step to ensure lidocaine is not injected into a vessel.*

1. Stand on the patient's contralateral side to the affected area. Have the patient open his or her mouth wide, without locking the temporomandibular joint.
2. Place your thumb in the coronoid notch and extend the patient's cheek laterally so that the pterygomandibular triangle can be visualized (see Figure 2).
3. Approach the coronoid notch from the opposite corner of the patient's mouth, aiming toward the pterygomandibular triangle. The distal end of the syringe should lie between the first and second premolars.
4. Insert the needle into the pterygomandibular triangle about 1 cm above the level of the teeth, advancing 2–2.5 cm until bone is contacted. If bone is not contacted after the needle is inserted to the hub of the syringe, withdraw completely and reposition.
5. Once bone is contacted, withdraw the needle about a millimeter and aspirate. If blood is returned, withdraw the needle completely and reposition. If no blood is returned, inject 2 ml of 0.5%



Figure 1. Supraperiosteal nerve block.



Figure 2. Inferior alveolar nerve block.

bupivacaine and then withdraw the needle.

6. Inform the patient that he or she may have some residual injection site soreness (Campo, 2011; Reed et al., 2012).

Mental Nerve Block

The mental nerve is an extension of the inferior alveolar nerve. This nerve block offers anesthesia to the ipsilateral lower lip and the gum. By holding pressure to the mental foramen for 2 min postinjection, the incisors, canine, and proximal portion of the premolars will be anesthetized as well (Campo, 2011; Reed et al., 2012).

1. Use the premolars as a landmark to identify the likely area of the mental foramen. It should be located between the first and second premolars, about 1 cm inferior and anterior to the second premolar.
2. Use a 5/8-inch needle to inject at this site. Insert the needle into the buccal fold at about a 45° angle with the bevel oriented toward the bone. The bone should not be contacted for this block.
3. Advance about 1 cm and aspirate. If blood is returned, withdraw the needle completely and reposition. If no blood is returned, inject 1–2 ml of anesthetic and then withdraw the needle.
4. Have the patient hold extraoral pressure over the site for about 2 min to force anesthetic into the foramen and provide analgesia to the teeth (see Figure 3).

Complications

Although rare, complications from dental nerve blocks do occur. Local complications include pain from injection, lack of anesthetic effect, and direct nerve damage from the needle, including paresthesia and trismus. Bleeding or hematoma formation at the injection site can also occur. These can be managed with direct pressure. The most serious complication occurs from failing to

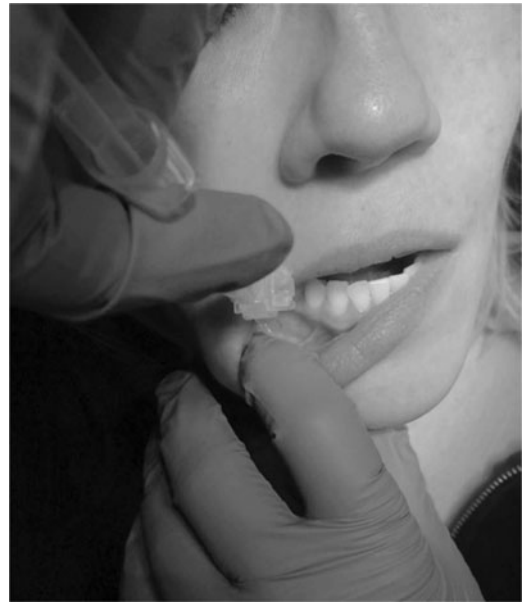


Figure 3. Mental nerve block.

aspirate before injecting, resulting in administration of bupivacaine directly into a vessel. Although most local reactions will resolve after the anesthetic wears off, injection into a vessel requires cardiac monitoring and possible admission (Reed et al., 2012). Some complications, such as nerve damage, may only become apparent later in the patient's course, so proper follow-up is a critical component of management (Leighton, 2017).

CONCLUSION

Dental blocks provide excellent pain control for patients with NTDP in the ED, especially given the advancement of ALTO programs in the wake of the opioid crisis. With care and practice, these techniques can become an invaluable dental pain management strategy for the emergency nurse practitioner.

REFERENCES

- Bajkin, B. V., & Todorovic, L. M. (2010). Safety of local anesthesia in dental patients taking anticoagulants: Is it still controversial? *British Journal of Oral and*

- Maxillofacial Surgery*, 50(2012), 65–68. Retrieved from http://www.exodontia.info/files/BJOMS_2012_Safety_of_local_anesthesia_in_dental_patients_taking_oral_anticoagulants_Is_it_still_controversial.pdf
- Becker, D. E., & Reed, K. L. (2006). Essentials of local anesthetic pharmacology. *Anesthesia Progress*, 53(3), 98–109. doi:10.2344/0003-3006(2006)53[98:EOLAP]2.0.CO;2
- Campo, T. M. (2011). Dental anatomy, examination, and anesthetics. In T. M. Campo, & K. A. Lafferty (Eds.), *Essential procedures for practitioners in emergency, urgent, and primary care settings: A clinical companion* (pp. 197–218). New York, NY: Springer.
- Centers for Disease Control and Prevention. (2016). *National Hospital Ambulatory Medical Care Survey: 2016 emergency department summary tables*. Retrieved April 17, 2019, from https://www.cdc.gov/nchs/data/nhamcs/web_tables/2016_ed_web_tables.pdf
- D'Amore, K., Traficante, D., & LaPietra, A. M. (2016, August 1). Introducing the ALTO alternatives to opioids program. *EMResident*. Retrieved from <https://www.emra.org/emresident/article/introducing-the-alto-alternatives-to-opioids-program/>
- Dionne, R. A., Gordon, S. M., & Moore, P. A. (2016). Prescribing opioid analgesics for acute dental pain: Time to change clinical practices in response to evidence and misperceptions. *Compendium of Continuing Education in Dentistry*, 37(6), 373–379. Retrieved from <https://pdfs.semanticscholar-org-proxy.library.vanderbilt.edu/5e15/8527fb0e83a088235d659f07fa1da8cb5b78.pdf>
- Khoury, J. N., Mihailidis, S., Ghabriel, M., & Townsend, G. (2011). Applied anatomy of the pterygomandibular space: Improving the success of inferior alveolar nerve blocks. *Australian Dental Journal*, 56(2), 112–121.
- Leighton, P. (2017, November 13). *Resident Clinical Pearl—Dental block, ER Doc*. Retrieved from <http://sjrhem.ca/rcp-dental-block-er-doc>
- Reed, K. L., Malamed, S. E., & Fonner, A. M. (2012). Local anesthesia Part 2: Technical considerations. *Anesthesia Progress*, 59(3), 127–137.
- Sun, B. C., Chi, D. L., Schwarz, E., Milgrom, P., Yagapen, A., Malveau, S., ... Lowe, R. A. (2015). Emergency department visits for nontraumatic dental problems: A mixed-methods study. *American Journal of Public Health*, 105(5), 947–955. doi:10.2105/AJPH.2014.302398
- U.S. Department of Health and Human Resources. (2017, October 26). *HHS Acting Secretary declares public health emergency to address national opioid crisis* [Press release]. Retrieved from <https://www.hhs.gov/about/news/2017/10/26/hhs-acting-secretary-declares-public-health-emergency-address-national-opioid-crisis.html>

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