

The Use and Benefits of Vibration as a Supplement to Conventional Local Anesthetic Injection

Jordan Schapiro, DDS, BS; Stevie Schapiro, BA; and Rachel Schapiro, BS

Abstract: The use of a valuable adjunct to the conventional local anesthetic injection can be tremendously helpful in combating dental patients' fears and anxieties of pain as well as the worries associated with the dental procedures themselves. This case report presents the actual tactical technique as well as the rationale for using the DentalVibe® injection comfort system while treating a fearful patient.

Dental anxiety is an emotion experienced in response to stress due to the uncertain factors that can transpire during treatment. These feelings are expressed globally.¹ In fact, 36% of the population suffers from dental anxiety or dental fear. This phobia leaves people stricken and terrified.^{2,3} Many of the individuals who exhibit dental phobia usually only present to the dentist when forced to do so due to acute pain.⁴ Signs and symptoms seen with dental phobia may include difficulty sleeping prior to the dental

appointment,⁵ becoming physically ill and/or emotionally breaking down at the thought of visiting the dentist or when dental instruments are placed in the mouth during treatment,⁶ and even complete avoidance of receiving dental hygiene.⁷ A pathologic fear or apprehension such as this may require psychological support.⁸

The DentalVibe® injection comfort system (DentalVibe, dentalvibe.com) helps to provide a practical, efficient solution to these debilitating challenges.^{9,10} The purpose of this case report is to illustrate the use and advantages of this technology as an integral supplement to the conventional local anesthetic injection technique.

Case Presentation

A 55-year-old female patient was referred by a general dentist as an emergency to the author's (JS) private endodontic practice with the chief complaint that her "upper right tooth killing" her. The patient had a noncontributory medical history and was taking no medications. The patient also reported no known drug allergies. Her oxygen saturation (SpO₂) was 99% and blood pressure was 130/80 mm Hg. Extraoral examination revealed no abnormal findings, and oral cancer screening was negative.

The clinical examination revealed severe pain to percussion and biting as well as vitality testing showing tooth No. 4 to have a necrotic pulp. Periodontal examination produced no pathologic pocketing or mobility. Upon examination of the digital radiograph in the region of the patient's pain, a periapical radiolucency was found associated with tooth No. 4 (Figure 1). A cone-beam computed tomography (CBCT)



Fig 1. Preoperative radiograph of tooth No. 4 exhibiting periapical radiolucency.

scan also confirmed the periapical pathology, as well as tooth No. 4 exhibiting three roots/canals (Figure 2 and Figure 3).

Based on these findings, endodontic diagnosis for tooth No. 4 was pulpal necrosis, symptomatic apical periodontitis.^{11,12} Treatment options were discussed with the patient, and she wished to save her tooth via endodontic therapy and then have it restored with a crown afterward by her restorative dentist. It was recommended to the patient to take 800 mg of ibuprofen in addition to 500 mg of acetaminophen offered to her preoperatively while in the dental chair to help alleviate postoperative symptoms upon completion of the root canal treatment. The patient agreed to take the medication.

The following is the author's actual tactical clinical technique in the use of the DentalVibe injection comfort system while anesthetizing, in this case, tooth No. 4 in preparation for root canal therapy. Topical anesthetic gel (HurriCaine® 20% Benzocaine, Beutlich Pharmaceuticals LLC, beutlich.com) was placed on the buccal mucosa with a cotton swab applicator for 2 minutes as well as on the palatal soft tissue for 2 minutes. The DentalVibe was turned on, then placed at the approximate apex of tooth No. 4 on the buccal mucosa with light pressure for 12 to 15 seconds. At this point a teardrop amount of local anesthetic (Articaine Hydrochloride 4% and epinephrine 1:100,000, 1.7 ml, Septodont, septodontusa.com) was very slowly deposited with a 30-gauge short needle (Accuject®, Dentsply Sirona, dentsplysirona.com) within 3 mm of one of the DentalVibe

prongs. After waiting approximately 1 minute (with the patient now starting to feel numb), about one-third of the Articaine carpule was again injected into the same vicinity very slowly. In another minute the rest of the carpule can be deposited at the same site (Figure 4 and Figure 5).

When dealing with an acutely symptomatic maxillary tooth, the author believes it is absolutely necessary to obtain anesthesia on the palatal aspect of the offending tooth to treat it painlessly. This is the point in the protocol when the benefit of the DentalVibe device excels. The palatal injection is traditionally the most feared and consistently most painful of the intraoral local injections given. Many dentists often bypass administering this injection because of the level of pain it usually induces. Because of the reluctance of practitioners in giving the palatal injection, in the instances when they do administer it, patients may often experience pain during the procedure, which magnifies their fear of the injection. When implementing the use of the DentalVibe for the palatal injection the same topical anesthetic is now placed on the palatal cervical gingiva just apical to the sulcus (Figure 6).

After a minute the DentalVibe is placed and the Articaine is injected slowly. With the palatal injection the goal is also to anesthetize the apex ultimately. To accomplish this in a pain-free manner the DentalVibe and Articaine injections are placed in a "piggyback" fashion in three to four steps until the apex is reached. With each injection the clinician should be

able to visualize mild blanching of the palatal tissue to ensure it is adequately anesthetized. Typically, 1.5 carpules are used for the buccal aspect and 0.5 carpule for the palatal. This technique with the DentalVibe device is also applicable and just as effective for mandibular blocks and infiltrations. The endodontic treatment for tooth No. 4 was initiated and obtained during the same appointment uneventfully (Figure 7). The patient tolerated the procedure well and left pleased.

Discussion

Patient anxiety about pain and injections specifically is a major challenge that dental professionals face daily. The DentalVibe provides a solution to this obstacle by using a unique application of cutting-edge research on the gate control theory of pain¹³ to enable the delivery of local anesthesia injections without discomfort.

The DentalVibe's patented, microprocessor-controlled VibraPulse creates a pulsed, percussive vibration to the mucosa with energized amplitude, which lightly taps the tissue in a synchronized, changing pattern, making it the ideal neural stimulation to block the painful stimuli of the injection. The vibratory impulses travel very quickly along thick, myelinated A-beta fibers at 75 meters per second. By contrast, the pain sensation travels slowly along thin, unmyelinated C nerve fibers at 2 meters per second. When both stimuli are applied at the same time, the vibration sensation reaches the sensory area of the brain, causing the release of

inhibitory neurotransmitters, preventing the activation of projection neurons at the synaptic junction in the dorsal horn of the spinal cord. This results in the closure of the gate to the sensation of pain.¹³

Conclusion

This case report highlights a successful positive technique for completely anesthetizing an acutely symptomatic tooth in a pain-free approach. As an endodontist in private practice for the past 20 years the author is now able to furnish an injection that can provide a seamless user experience (for the dentist) as well as a pleasing customer experience (for the patient). For endodontists, emergency patients with acutely symptomatic and abscessed teeth are seen on an everyday basis. The DentalVibe provides an efficient, pain-free injection resulting in a positive experience for the patient while transforming the negative connotation of root canal therapy to a positive one. As the great poet Maya Angelou once wrote, "People will forget what you said, people will forget what you did, but people will never forget how you made them feel."¹⁴ The DentalVibe injection comfort system is a natural extension of clinicians making patients feel at ease.

DISCLOSURE

This article was commercially supported by DentalVibe.

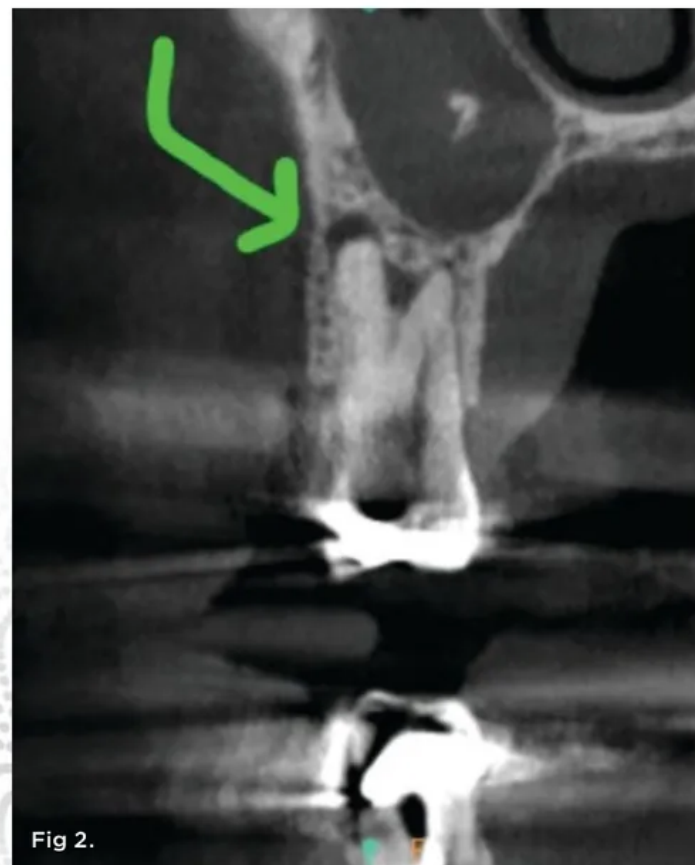


Fig 2.

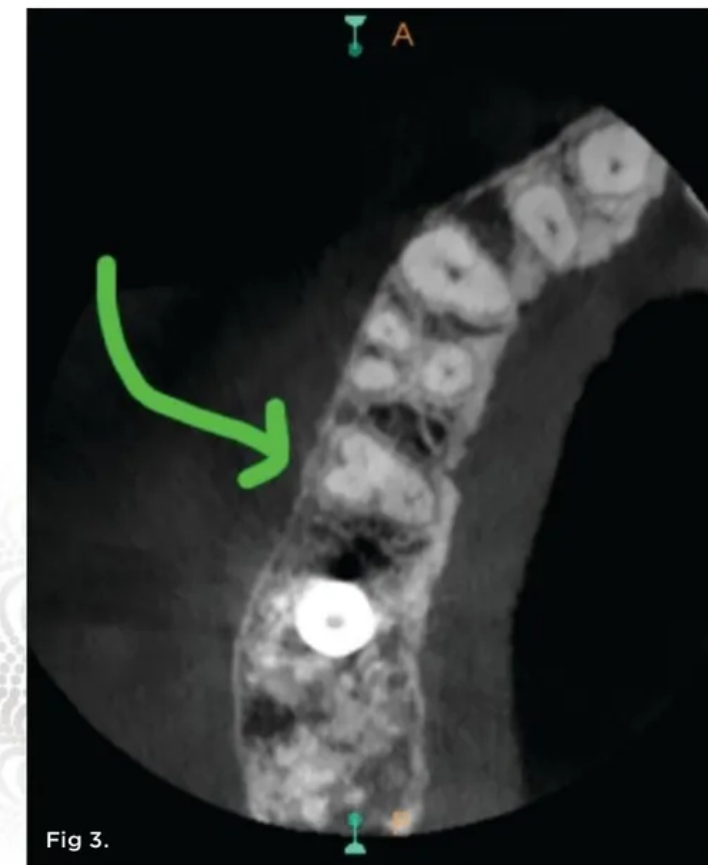


Fig 3.



Fig 4.



Fig 5.



Fig 6.



Fig 7.

Fig 2. CBCT showing coronal view of tooth No. 4 with periapical radiolucency. Fig 3. CBCT showing axial view of tooth No. 4 with three roots and three canals.

Fig 4. The DentalVibe injection comfort system. Fig 5. Buccal injection of tooth No. 4 with the DentalVibe. Fig 6. Palatal injection of tooth No. 4 with the DentalVibe. Fig 7. Final radiograph of tooth No. 4 obturated.

ABOUT THE AUTHORS

Jordan Schapiro, DDS, BS

Adjunct Faculty, Post Graduate Endodontics, Nova Southeastern University College of Dental Medicine, Fort Lauderdale, Florida; Private Practice in Endodontics, Boca Raton, Florida

Stevie Schapiro, BA

PhD candidate, Nova Southeastern University College of Psychology, Fort Lauderdale, Florida

Rachel Schapiro, BS

Dental Student, Nova Southeastern University, Fort Lauderdale, Florida

REFERENCES

1. Saatchi M, Abtahi M, Mohammadi G, et al. The prevalence of dental anxiety and fear in patients referred to Isfahan Dental School, Iran. *Dent Res J (Isfahan)*. 2015;12(3):248-253.
2. Hill KB, Chadwick B, Freeman R, et al. Adult Dental Health Survey 2009: relationships between dental attendance patterns, oral health behaviour and the current barriers to dental care. *Br Dent J*. 2013;214(1):25-32.
3. Beaton L, Freeman R, Humphris G. Why are people afraid of the dentist? Observations and explanations. *Med Princ Pract*. 2014;23(4):295-301.
4. Appukuttan DP. Strategies to manage patients with dental anxiety and dental phobia: literature review. *Clin Cosmet Investig Dent*. 2016;8:35-50.
5. Abrahamsson KH, Berggren U, Hallberg L, Carlsson SG. Dental phobic patients' view of dental anxiety and experiences in dental care: a qualitative study. *Scand J Caring Sci*. 2002;16(2):188-196.
6. Stouthard ME, Hoogstraten J. Ratings of fears associated with twelve dental situations. *J Dent Res*. 1987;66(6):1175-1178.
7. Ragnarsson B, Arnlaugsson S, Karlsson KÖ, et al. Dental anxiety in Iceland: an epidemiological postal survey. *Acta Odontol Scand*. 2003;61(5):283-288.
8. Peltier B. Psychological treatment of fearful and phobic special needs patients. *Spec Care Dentist*. 2009;29(1):51-57.
9. Ching D, Finkelman M, Loo CY. Effect of the DentalVibe injection system on pain during local anesthesia injections in adolescent patients. *Pediatr Dent*. 2014;36(1):51-55.
10. Hassanein PH, Khalil A, Talaat DM. Pain assessment during mandibular nerve block injection with the aid of dental vibe tool in pediatric dental patients: a randomized clinical trial. *Quintessence Int*. 2020;51(4):310-317.
11. Glickman GN. AAE Consensus Conference on Diagnostic Terminology: background and perspectives. *J Endod*. 2009;35(12):1619-1620.
12. American Association of Endodontists. *Glossary of Endodontic Terms*. Tenth ed. Chicago, IL: American Association of Endodontists; 2020. <https://www.aae.org/specialty/clinical-resources/glossary-endodontic-terms/>. Accessed June 5, 2022.
13. Melzack R, Wall PD. Pain mechanisms: a new theory. *Science*. 1965;150(3699):971-979.
14. Angelou, Maya. 2003. Goodreads website. <https://www.goodreads.com/quotes/5934-i-ve-learned-that-people-will-forget-what-you-said-people>. Accessed June 5, 2022.

PAIN-FREE DENTISTRY Begins with a Pain-Free Injection

Millions fear the dentist because of painful oral injections. DentalVibe® alleviates the anxiety of oral injections by massaging the nerves and tissue around the injection site for better dental experiences, helping once petrified patients smile every day!

Drop the old-school and ineffective cheek shake and start giving real pain-free injections with DentalVibe!

CAN YOU PROVIDE PAIN-FREE INJECTIONS?

FOLLOW THIS PROTOCOL:

- light touch
- 15 seconds of vibration
- injection within 3mm of the prong