

Utility of Vibratory Stimulation for Reducing Intraoral Injection Pain

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Intraoral local anesthesia injection is often perceived as a painful and anxiety-causing dental procedure. Vibration stimulus is one of the nonpharmacologic methods used to reduce unwanted sensations of local anesthesia injection. This clinical study evaluated the effectiveness of a recently introduced vibratory stimulation device in intraoral local anesthesia administration. Thirty-two subjects underwent 2 maxillary local anesthesia injections in 2 different sessions: 1 with conventional techniques and 1 with the aid of a vibratory stimulation device (DentalVibe). The pain levels were evaluated with a visual analog scale and the Wong-Baker FACES Pain Rating Scale. The subjects were asked to choose the preferred method for future injections. The data were evaluated statistically. There were no significant differences between the 2 injection methods with regard to either pain evaluation method. The preference of the subjects regarding future injection technique was evenly distributed between the groups. The vibratory stimulation device used in this study did not provide any reduction in pain level associated with maxillary infiltration local anesthesia administration.

Key Words: Vibratory stimulation; Local anesthesia; Pain; Anxiety.

A significant number of patients still perceive administration of local anesthesia as a painful and anxiety-causing dental procedure. Several methods have been described to reduce pain and anxiety caused by local anesthesia administration. These include buffering the local anesthetic, warming the local anesthetic, applying topical anesthesia before injection, reducing injection speed, and using fine needles with electric delivery devices.¹ Vibration stimulus is one of the nonpharmacologic methods used to reduce unwanted sensations of local anesthesia injection. It is based on gate control theory, which was proposed by Melzack and Wall in 1965.² This theory implies that nonpainful input closes the “gates” to painful input, which prevents pain sensation from traveling to the central nervous system. Although the theory has been updated because of advances in neuroscience, the basic concept is still applicable.

Although this scientific theory was established in 1965, a device using vibration inhibition of injection pain was designed by George C. McCann in 1939. It was granted a US patent in 1941.³ Other devices have been designed to be used in conjunction with local anesthesia injection.^{4,5} The common feature of these devices is the delivery of vibration stimulus to the target area to reduce the pain of injection. Numerous types of these devices have been in the market since those years to be used both for intraoral anesthetic administration and intramuscular drug injection through skin. Despite the long history of this method, the number of the studies concerning the effectiveness of these devices for intraoral use is limited. In this prospective, crossover, clinical study, we aimed to evaluate the feasibility and effectiveness of DentalVibe (Boca Raton, Fla), a vibration device that can also retract and illuminate the target injection area, in intraoral local anesthesia administration. It is a wireless, rechargeable, handheld device that delivers pulsed percussive, tapping vibration to the surrounding mucosa at the injection site (Figure 1).

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METHODS

Thirty-two volunteers, who were undergraduate dental students at Rangsit University, Faculty of Dental