

# THE BENEFITS OF VIBRATION ON DENTAL PAIN AND ANXIETY



DENTAL *Vibe*





Dental anxiety and dental phobia are real issues facing the profession. It's estimated that anywhere from 9 to 15 percent of Americans — 30 to 40 million people — avoid dental appointments due to fear and anxiety, which they commonly link to pain associated with the visit.

But what if there were a way to lessen the anxiety associated with local anesthesia injections during a dental visit? Adults would have less reason to avoid appointments, and children would be less likely to act out during a visit. Making anesthesia injections less painful means making the overall dental visit more comfortable, which can only help decrease the fear and anxiety associated with dental appointments and procedures.

Recent studies have shown that the answer to lessening dental pain and anxiety is through vibration. This paper's objective is to guide you through the benefits of pairing local anesthesia injections with vibration by demonstrating the positive effect it can have on your patients.



## METHODS FOR COMBATting DENTAL PAIN AND ANXIETY

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It's no secret that the first step of an invasive dental procedure is the administration of local anesthesia. Therefore, the need to control pain and anxiety is one of the most important aspects of administering local anesthesia.

Various methods have been used to prevent pain during anesthesia administration: topical anesthetics, suggestion, psychological techniques (such as distraction with audiovisual glasses), computer-assisted local anesthesia (using the Wand system), and vibration.

The effects of these methods vary. Topical anesthetics may numb the surface of an area before the local anesthesia is injected by needle, but they don't completely eliminate pain, and their effectiveness depends on the type, amount, and injection rate of anesthesia used and the dentist's expertise. Beyond that, topical anesthetics will combat pain only at a surface level — they generally will not provide deep-level pain relief. The Wand system helps control the flow rate of anaesthetic, but does not help with needle pain at the surface level or deeper.

Vibration offers counter-stimulation during the injection of anesthesia. In 1965, Melzack and Wall introduced the Gate Control Theory of Pain, which determined that the sensation of pain can be reduced by activating nerve fibers that conduct non-noxious stimuli. This means that the stimulation from vibration will reduce the perception of pain by interrupting the nociceptive signals in the brain. Vibration, therefore, will usually prevent the brain from perceiving pain by slowing down the travel of pain sensation to the brain.



## EVIDENCE OF THE BENEFITS OF VIBRATION

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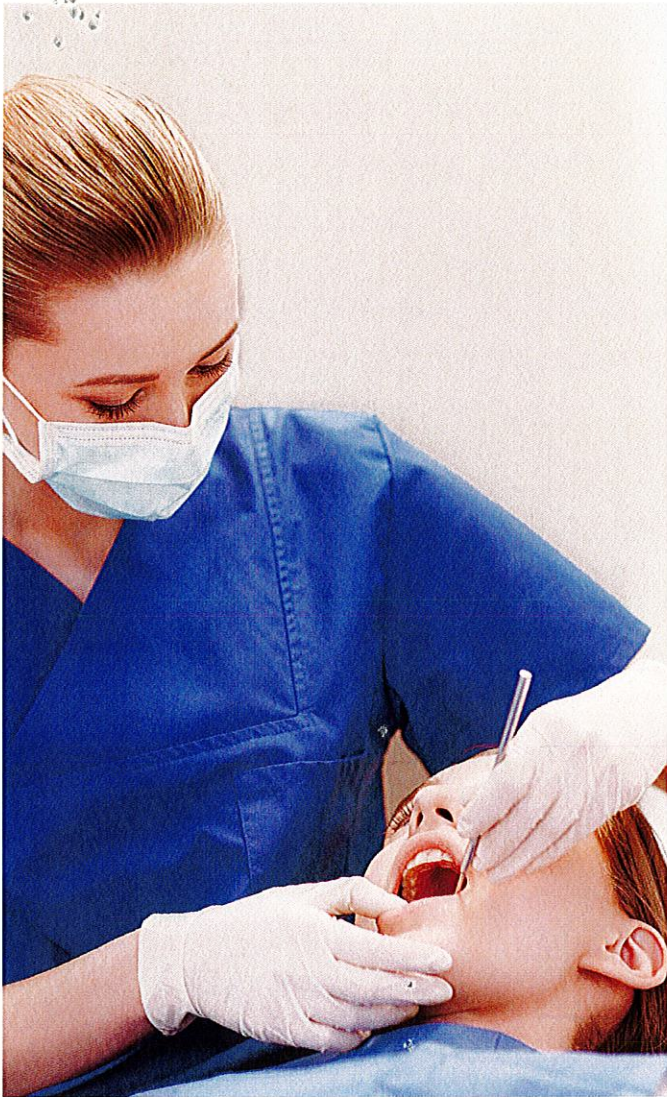
Recent studies have shown that vibration is one of the least intrusive and most effective methods of reducing pain felt during the administration of anesthesia.

A 2012 study from the Department of Oral and Maxillofacial Surgery at Karadeniz Technical University evaluated the effects of vibration-assisted local anesthesia on pain and anxiety. Fifty patients ranging from 19 to 68 years old — 30 females and 20 males — were referred for tooth extraction. The study was conducted as a split-mouth study: In all patients, all injections on the right side were given with stimulation from a vibration device — a product called DentalVibe from BING Innovations in Florida — while conventional injections were performed on the left side of the mouth without the use of a vibration device. This gave the researchers two groups to analyze the effects of vibration: the vibration group and the control group (the side without vibration).

For the vibration group, when anesthesia was being administered on the right side of the mouth, the two tips of the DentalVibe were placed on the oral mucosa, effectively zeroing in on the injection site, before administering local anesthesia. The needle for administering anesthesia was inserted between the two tips of the device, and always by the same oral surgeon. Identical amounts of local anesthetic were administered on both sides of the mouth for both groups.







After injecting the local anesthetic, study subjects were asked to rate their pain. In the vibration group, patients rated pain as significantly lower than the pain in the control group. The study concluded that vibration — through the use of the DentalVibe — reduced pain during local anesthesia injection without inducing anxiety.

In a similar study, published in 2013 by the American Academy of Pediatric Dentistry, researchers sought to compare the pain rating from what they termed an exposure group — anesthesia injections administered along with a vibration instrument, in this case using DentalVibe again — and the control group, or the group that experienced traditional anesthesia injection without the addition of vibration.

In this study, 36 subjects (15 males, 21 females) between the ages of 10 and 17 were selected for participation. As in the study recounted above, all subjects received two separate injections of local anesthesia — one with the aid of vibration and one without. Before all injections took place, topical anesthesia was administered to the targeted injection site, and all injections were performed by the same oral surgeon. To control for expectation, the DentalVibe was placed near the injection site for all injections, although it was not turned on for the control group.



When the DentalVibe was utilized for the exposure group, it was applied to the targeted injection site and turned on for five seconds to stimulate the area where the needle would penetrate. After those initial five seconds, the needle was inserted, and the DentalVibe continued vibration while the needle was delivering the anesthesia. Then the needle was removed, followed by the DentalVibe.

After each injection, patients were asked to rate their level of discomfort. Out of 36 subjects, 30 found injection with vibration using DentalVibe to be less painful than injection without vibration (traditional technique). Only three of the 36 subjects found injection with DentalVibe to be more painful than the control injection, and three of the 36 subjects found both injections to be equally painful. Of the 30 subjects who found in favor of vibration during injection, 17 of those reported no pain whatsoever when vibration was paired with anesthesia injection. (Only three subjects felt no pain during the traditional injection, and one of those three also felt no pain during the exposure injection.) Additionally, there was no significant correlation found between the subjects' self-reported pain rating and the subjects' age.

This study concluded by finding that most subjects (83 percent) found that injection with the application of vibration (through DentalVibe) was overall less painful than the injection without vibration.

Together, both of these studies provide convincing evidence to support the utilization of vibration while administering local anesthesia for invasive dental procedures. Compared to injections where vibration was not utilized, injections with vibration resulted in less pain and lower pain ratings among subjects overall.

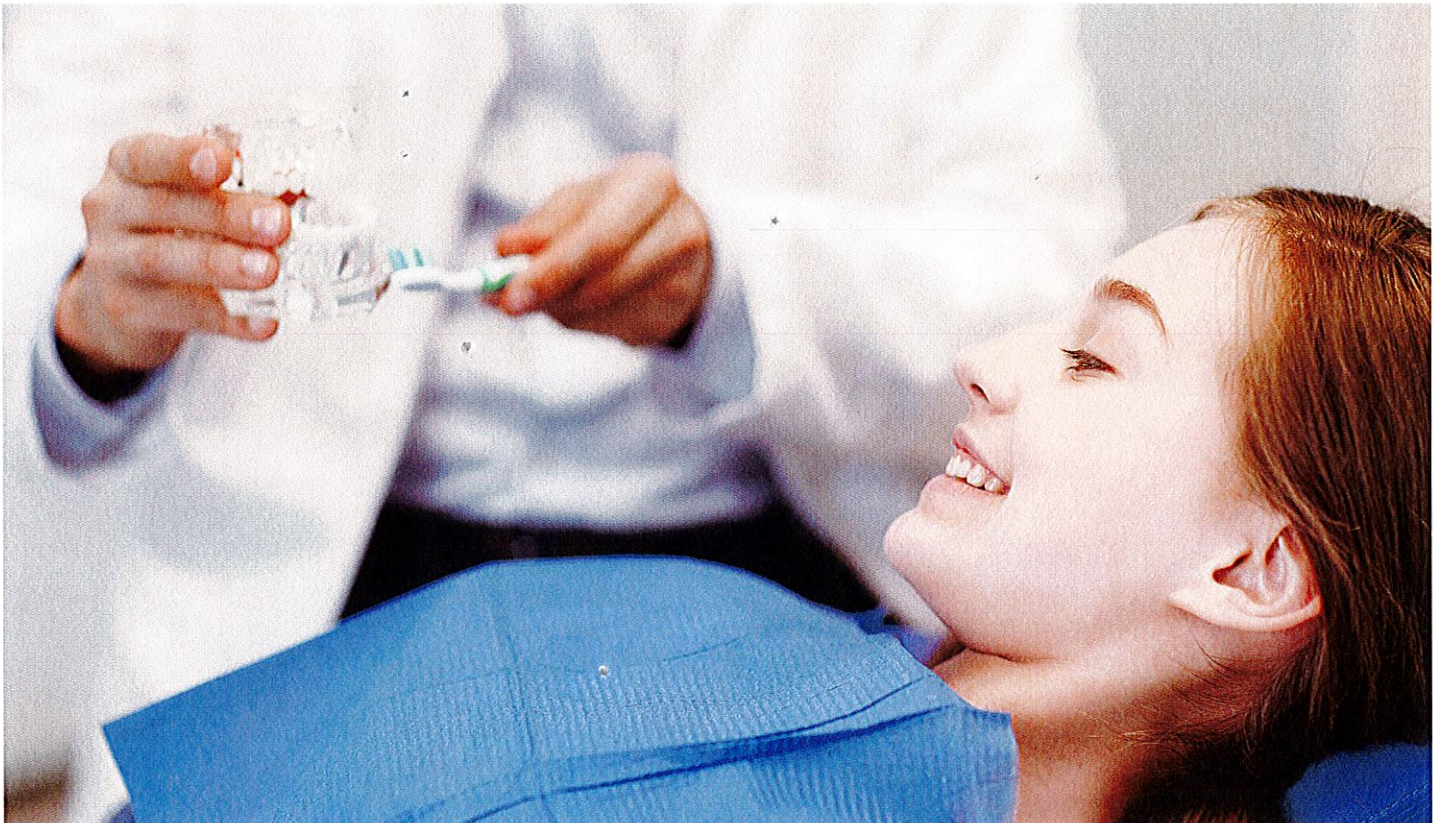


## MORE ON THE DENTALVIBE INJECTION COMFORT SYSTEM

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DentalVibe is not the only tool that has been devised to deliver stimulation of the mechanoreceptors during delivery of anesthesia injections, with the goal of reducing pain during injections. Other instruments have included a personal massager, a vibrating syringe attachment, and a vibrating swab for topical anesthetic application. Another product, called VibraJect, is a vibrating attachment for a traditional syringe; a 2011 study found that this device did not significantly reduce the subjects' pain, likely because the vibrations it created were too small to activate the large nerve fibers at the targeted injection site.

DentalVibe, which one study compared in appearance to a cheek retractor, is a cordless, rechargeable, handheld device that delivers pulsed, percussive micro-oscillations to the site where an injection is being administered. The needle is inserted in a small space — the targeted injection site — between two pronged tops of the device.







## CONCLUSION

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In conclusion, the benefits of using vibration during anesthesia administration during invasive dental procedures are clear: As demonstrated by recent studies, vibration aids in reducing pain and anxiety in patients. The result of vibration during such dental procedures that require an anesthesia injection is greater comfort and less stress for the patient, along with long-term benefits for the dentist as their patient slowly comes to view dental appointments with less fear and anxiety.