# VibraJect vs. theWand
## for the control of injection pain.

by
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## ABSTRACT

A VibraJect device was compared to a computer controlled injection device to control pain for injection of local anesthesia. This study was performed in a general dental practice. Nineteen injections were done with the Wand handpiece of the CompuDent ™ system by Milestone and seventeen with the VibraJect by VibraJect LLC. Twenty-four were maxillary infiltrations twelve were mandibular blocks. Patients reported the level of pain for the needle piercing their tissue, the injection of solution, and their overall evaluation of the injection. No difference was seen for piercing the tissue, injecting the solution or overall report of pain.

## INTRODUCTION

Most dentists will take reasonable means to assure that a patient has little or no pain during their treatment. To this end, local anesthesia is injected to render the patient insensitive to painful procedures. However, injecting local anesthesia is itself a painful procedure. To help block or mask the pain of injection, various procedures and devices have been employed.

Topical application of local anesthesia is the most common means used to control the pain of local anesthesia injections. There are conflicting studies of the effectiveness of this technique. Minasian and Yagiela suggested that topical anesthesia might be more effective if the charged ions of an anesthetic agent were driven through the tissue by iontophoresis prior to inserting a needle. Other studies have suggested that topical anesthetics may be associated with toxic sequelae because of the amounts of drug absorbed through the mucosa and the relative toxicity of some of the topical agents. Because of these problems, a predictable means of pain control for injections is desirable.



In a previous study the author compared a Transcutaneous Electrical Nerve Stimulation (TENS) device stimulation vs. topical anesthesia. Patients preferred the TENS device over topical at a 3 to 1 preference.

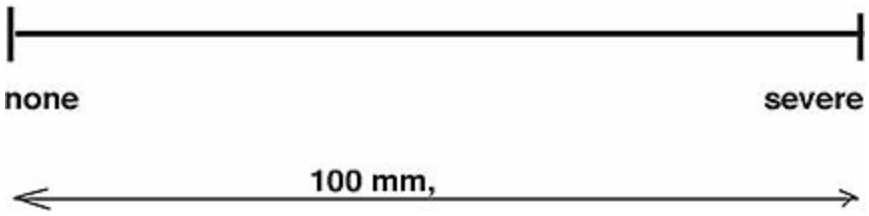
A pilot study that lead to the study compared TENS to a vibrating device as a placebo. This protocol was abandoned because the vibrating device was as effective as the TENS. The vibrating device was not a placebo; it was an active pain control device. The purpose of this study was to determine if a new vibrating device, the VibraJect, that clips on they syringe could be effective to control the pain caused by a local anesthesia injections. Since there can be pain from the penetration of the needle through the mucosa and from the stimulation of the first few drops of local anesthesia solution as it is injected, we also looked at the pain associated with the deposition of the local anesthesia. We compared this relative inexpensive VibraJect with the Wand a computer-controlled device the costs in excess of $1,000 US.

Figure 1. The VibraJect is seen clipped on the syringe.
The VibraJect it turned on by turning the green cap clockwise.

Figure 2. The various components of the Compudent system can be seen.

## METHODS

The study design is a single center, multiple practitioners, unblinded, randomized clinical trial. All patients are patients in a private general dental practice. Thirty-six consecutive patients needing a local anesthesia injection were included in the study. The patients' age, sex, apprehension score and needed treatment were recorded. Only American Society of Anesthesiology (ASA) classification I and II patients were eligible for the study. The study was limited to those over 18 years of age.




Although, a double blind study design is preferred, it is impossible with this equipment. The patient cannot be blinded to the technique, because it is very obvious if the device is vibrating. In place of a sham machine, it was decided to test the VibraJect device against the more costly Wand.

Prior to the injections, the patient's self reported level of apprehension was determined by a questioner asking if they would classify them selves as calm (1), a little nervous (2), tense (3), afraid (4), panicked (5), or terrified. (6) Age, sex, and date of procedure was also recorded. At the conclusion of the study, these parameters were compared for both the control and active groups to test for similarity of the two groups. Technique selection was randomized and recorded on evaluation sheets that were prepared in advance and used in order, 1 to 36.

Both devices were use without topical anesthesia. The injections were divided into two phases. Phase one was piercing the tissue with the needle before any anesthetic is injected. The needle was inserted by a quick jerk of the cheek while rapidly inserting the needle. Depth of penetration was

about 4 mm. Periosteum was not touched.

The patient was shown the VAS prior to their injection and explained how to report their pain level. Once the needle was through the tissue but before the anesthetic was injected, the patient was asked to report their discomfort on a visual analog scale (VAS) held by the assistant. The VAS is a single line 100 mm long one end is marked "none" the other "severe."

Figure 3. The Vasa scale is a 100 mm line with "none on one end and "severe" on the other. The patient is asked to place a mark that represents the amount of pain they had for the selected procedure. The mark is then measured from the "none" end of the line and this measurement is recorded. The VAS scale does not include the dimension line shown here.

An appropriate amount of anesthetic solution, 2% lidocaine with 1:100,000 dilution of epinephrine, was then injected slowly when using the VibraJect and on the slower of the two available rates with the Wand. The patients reported their discomfort for the injection on a second VAS. Their overall rating of the technique was reported on a third VAS.

## RESULTS

Thirty-six consecutive patients, provided the needed device was available, were given injections. The study ran from February 2, 2005 to March 23, 2005. A preprinted form was selected in a random order. This form determined which technique was used. Seventeen female and nineteen male patients were selected. The patients ranged in age from 18 to 83 years, mean 53 years, Standard Deviation(SD) =13 years. No patients were rejected from the study.

The injections were evaluated by grading the pain experienced when the needle punctured the tissue and the pain due to injecting the anesthetic solution. The patients' overall evaluation of the unpleasantness of the injection was evaluated. Means and Standard deviations of all measurements were computed. The pain for needle puncture for the VibraJect was, mean 17.5, SD 19.7 for the Wand a mean of 16.0, SD = 15.7. The pain for injection of local anesthesia for the VibraJect was, mean 14.6, SD 18.0 for the Wand a mean of 12.6, SD = 18.8. The overall evaluation of unpleasantness was less for the VibraJect group, mean 11.9, SD = 17.7 vs. a mean of 9.7, SD = 9.6 for the topical anesthesia group. No statistical difference could be shown for the two techniques.

### Comparison of two injection techniques

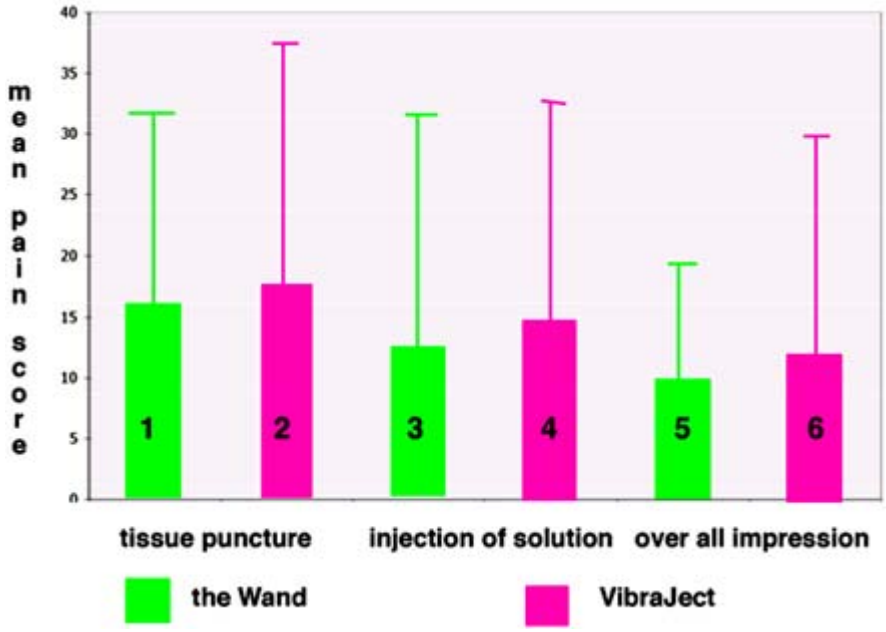



Figure 4. Blue is the mean for each measurement; maroon is the standard deviation. One and two is the mean reported pain of piercing the tissue. One is for the Wand; two is the VibraJect. Three and four is the mean report of pain for injection of local anesthesia solution. Three is for the Wand; four is for the VibraJect. Five and six is the patient's overall mean report of pain for the injection. Five is for the Wand; four is for the VibraJect. No statistical difference could be seen for the different devices.

## DISCUSSION

Two different techniques were used to control the pain of local anesthetic injections. No difference could be shown between the two. When the practitioner compared the two different techniques, the Wand is a lightweight probe attached to a computer controlled injection device by a thin plastic tube that carries the solution to the wand. A foot pedal controls the device. It takes a few injections to get accustomed to the foot pedal. This device allows two speeds of injection only the slow speed was used. It is also possible to aspirate by taking your foot off the foot peddle.

The VibraJect was clipped to the syringe body and requires little if any change from the normal injection technique. The body of the vibrator should be oriented so it does not rest on the patient's teeth.

## CONCLUSION

This study tends to indicate there is little difference in the pain perceived by a dental patient when injected using the Vibraject as opposed to injecting with the wand.

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