Use of an External Vibratory Device as a Pain Management Adjunct for Injections of the Foot and Ankle

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Introduction and Purpose

Injection therapy is a common modality utilized by the podiatric physician for a wide variety of purposes such as local anesthesia, pain management or as a diagnostic aid. These injections often elicit significant pain due to the sensitivity of the foot and the depth of these injections. The pain caused by injections has been associated with impaired patient compliance\(^1\) or deferring further injections due to needle phobia\(^2\). There are a range of modalities to reduce the pain of injection such as topical anesthetics or cold spray applied to the injection site. Recently there has been interest in utilizing vibratory stimulation to stimulate A\(\beta\) fibers which reduce pain utilizing the pain gating phenomenon. Previous studies have shown promising results in both pediatric\(^3\) and adult\(^4\) subject groups. Specifically, the Buzzy\(\textregistered\) (MMI Labs, Atlanta, GA), or external vibratory device, has been used to aid in injections in the pediatric population. As of writing this study there have been no studies performed investigating the usefulness of this device in foot or ankle applications. The purpose of this study is to determine the efficacy of combining vibratory and cold stimulation in reducing the pain associated with injections of the foot or ankle.

Methodology

The design of this study was a prospective randomized trial using 42 patients at the Temple University Foot and Ankle Institute (FAI) and 69 patients from a private practice clinic. Consent to participate in the study was obtained. The purpose of this study was to determine the pain associated with injections of the foot or ankle. There were limitations to this study as follows: injections were on different days for patients at the FAI. Randomization was performed by using sealed opaque envelopes which would designate control or intervention. This envelope would be opened blinded before the intervention was performed. The study population was divided into two random groups: vibration group and control group. Both groups received vapocoolant spray at the injection site immediately before the injection. Patients were asked to look away from the injection and to focus on sensation in the foot or ankle. Patients were given 10 point numerical pain using scale (NPRS) for which they would rank their pain. The attending physician would provide a scripted explanation of the NPRS. Additionally the attending physician would record the patients pain level using the Wong Baker Faces Pain Scale (WBPFS).

Results

The use of vibratory stimulation was demonstrated to produce a decrease in pain associated with injections to the foot and ankle. Further studies are needed to optimize the use of this modality for foot and ankle injections.

Discussion and Conclusion

The impaired test indicated a significant difference in both NPRS (p=0.022) and WBPFS (p=0.001) between the control and intervention groups with significant cut off at a p value of 0.05. The use of the device decreased pain 1.3 points on the NPRS and 1.76 on the WBPFS. The use of vibratory stimulation via the Buzzy\(\textregistered\) unit provides worthwhile decrease associated with foot and ankle injections. The unit demonstrated to be a cost effective, user friendly, and well tolerated pain management adjunct.

There are limitations to this study as follows: injections were on different anatomical sites, injection technique, and ability. There are opportunities to further investigate this modality by controlling for age, anatomical site, the effect of injectable material, or optimizing the positioning of the vibratory stimulus. We believe there may be further benefits to be discovered by undertaking additional investigations of these attributes.

Conclusion: The use of vibratory stimulation was demonstrated to produce a decrease in pain associated with injections to the foot and ankle. Further studies are needed to optimize the use of this modality for foot and ankle injections.

References