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

Joseph D. Rundell BS, Joshua A. Sebag, BA, Tracey C. Vlahovic, DPM, FFPM RCPS (Glasc), Robert W. Herpen DPM, & Carl Kihn, DPM, AACFAS

4th year student, Temple University School of Podiatric Medicine, Philadelphia, Pennsylvania
*Clinical Associate Professor, Department of Podiatric Medicine, Temple University School of Podiatric Medicine and Temple University Hospital, Philadelphia, Pennsylvania

Podiatric Louiville, Kentucky

Introduction and Purpose

Injection therapy is a common modality utilized by the pediatric 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 or deferring further injections due to needle phobia. 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 reduce the pain of injection which will reduce pain utilizing the pain gating phenomena. Previous studies have shown promising results in both pediatric and adult subject groups. Specifically, the Buzzy® (MMJ Labs, Atlanta, GA), or external vibratory device, has been used to aid in injections in both pediatric and adult populations. 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 volunteer patients of Temple University Foot and Ankle Institute and 6 volunteers from a private practice clinic. Consent to participate in the study was obtained from each patient. Subjects had injections in both feet and ankles. Specifically, the Buzzy® (MMJ Labs, Atlanta, GA), or external vibratory device, has been used to aid in injections in both pediatric and adult populations. Previous studies have shown promising results in both pediatric and adult subject groups. Specifically, the Buzzy® (MMJ Labs, Atlanta, GA), or external vibratory device, has been used to aid in injections in both pediatric and adult populations.

Subject Population: Patients for whom injection of the foot or ankle was deemed necessary by the attending physician. Exclusion criteria were as follows: skin-compromised, over the Buzzy® application site, history of peripheral neuropathy, rheumatoid arthritis, chronic pain, or violent temperament, patient not fluent in the English language. Use of analgesics within 6 hours before injection.

Randomization: After informed consent patients were randomized intertreatment or intervention groups immediately prior to injection. The control group received topical spray only and the intervention group received evaporated and sprayed lidocaine or a Buzzy® vibratory device placed close to the injection site. The total intervention was performed by using either topical spray which would stimulate control or intervention. This envelope would be opened shortly before the injection was performed. As the patient placed the Buzzy® stimulation was done via a modest number assignment.

Procedure: After consent and randomization were performed, the skin over the injection site would be prepped with lidocaine under injection site protocol. If the patient was designated as an intervention, a Buzzy® unit was placed on the skin over the anatomic course of the appropriate nerve 2 inches proximal to the injection site and turned on for 1 minute before the injection. Both groups received evaporated and sprayed lidocaine at the injection site immediately before the injection. All injections were performed by 20 year old medical students under the direct supervision of the attending physician (above author). Patients were asked to look away from the injection and instruct was given to the foot or ankle.

Examinations: Patients were given a 10 point numerical pain rating scale (NPRS) for which they would rank their pain. The attending physician would provide a scriptural explanation of the NPRS. Additionally, the attending physician would rate the patient's pain level using the Wong Baker Faces Pain Scale (WBPS). The study was performed via the use of a Buzzy® XL Healthcare unit which is applied using a Velcro strap (see Figure 1, below). Patients were asked to look away from the injection and instruct was given to the foot or ankle.

Results

The design of this study was a prospective randomized trial using 42 volunteer patients of Temple University Foot and Ankle Institute and 6 volunteers from a private practice clinic. Consent to participate in the study was obtained from each patient. Subjects had injections in both feet and ankles. Specifically, the Buzzy® (MMJ Labs, Atlanta, GA), or external vibratory device, has been used to aid in injections in both pediatric and adult populations. Previous studies have shown promising results in both pediatric and adult subject groups. Specifically, the Buzzy® (MMJ Labs, Atlanta, GA), or external vibratory device, has been used to aid in injections in both pediatric and adult populations.

Discussion and Conclusion

There was a modest decrease in pain associated with injections to the foot and ankle. There were limitations to this study as follows: injections were to different anatomical sites, injection technique and ability may differ from clinician to clinician. Furthermore, there may be further benefits to be discovered regarding additional modality or combinations of these attributes. We thank Mandy T. Meyers, FACP, CAFCFAS, for his work on the statistical analysis. We also wish to thank Eleonora A. Kihm, DPM (above author) for her help in the technical analysis of the data. References

Table 1 (below): This table examines the simple effect of the Buzzy® vibration device compared to the control group. The table provides the mean NPRS value obtained from the intervention group and the control group. The difference is significant compared to the control group.

Table 2 (below): This table examines the simple effect of the Buzzy® vibration device compared to the control group. The table provides the mean NPRS value obtained from the intervention group and the control group. The difference is significant compared to the control group.

Table 3 (below): This table examines the simple effect of the Buzzy® vibration device compared to the control group. The table provides the mean NPRS value obtained from the intervention group and the control group. The difference is significant compared to the control group.

Figure 1 (below): The design of this study was a prospective randomized trial using 42 volunteer patients of Temple University Foot and Ankle Institute and 6 volunteers from a private practice clinic. Consent to participate in the study was obtained from each patient. Subjects had injections in both feet and ankles. Specifically, the Buzzy® (MMJ Labs, Atlanta, GA), or external vibratory device, has been used to aid in injections in both pediatric and adult populations. Previous studies have shown promising results in both pediatric and adult subject groups. Specifically, the Buzzy® (MMJ Labs, Atlanta, GA), or external vibratory device, has been used to aid in injections in both pediatric and adult populations.

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