


Wound Management

Effects of Whole-body Vibration on Management of Itch and Neuropathic Pain in Pediatric Patients with Burn Injuries

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The purpose of this case series was to describe the impact of whole-body vibration (WBV) on acute itch and neuropathic pain management in children with burn injuries. Three children ages 10 to 14 years old with burns ranging from 40 to 64% total body surface area participated in WBV. Sessions of WBV occurred 2 to 5 times per week lasting 1 to 15 minutes. All participants experienced an acute reduction in itch and neuropathic pain symptoms, and none of the participants reported any skin breakdown or other adverse events related to the WBV. While formal research is needed on this topic to further explore the findings, this observational case series demonstrates that WBV could be a safe and effective mode of short-term symptom management in order to improve tolerance of physical and occupational therapy in pediatric patients with burn injuries.

BACKGROUND

Approximately 113,000 children are treated for burn injuries in the United States each year.¹ Of these cases, about 13,000 experience burns that are significant enough to require hospitalization.² These children often need extensive rehabilitation to maximize their cosmetic and functional outcomes.³

Itch and neuropathic pain are common in patients with healing burn injuries with 35% of patients experiencing moderate itch and 14% with severe symptoms.⁴ In total, as many as 87% of patients with burn injuries report having itch, which is most common in the first 18 months after injury.^{4,5} Neuropathic pain is also common following burn injury. Electrical injuries lead to a particularly high risk of secondary neuropathic pain with 24% of patients experiencing paresthesia.⁶ Itch and paresthesia are more common in children with burn injuries compared to adults and are more common in the lower extremities than the upper extremities.⁵ Itch often impacts multiple aspects of a patient's life including anxiety, daily living skills, and wound closure as it can cause patients to reopen areas of previously closed skin delaying healing and increasing risk of infection.⁴ Itch can be particularly disruptive during rehabilitation sessions as it can be brought on or worsened by heat and physical activity.⁵ Common treatments for itch include cool compresses, lotions, and medication, but these methods often do not completely eliminate the itch especially during exacerbating activities.⁵ In addition, there

has been very little study of neuropathic pain treatment in children of any diagnosis resulting in the use of treatment mechanisms designed for adults.⁷ Since a child's response to nerve injury is related to developmental age, the use of adult treatments may not yield ideal results.⁷

Whole-body vibration (WBV) uses a rapidly oscillating platform to stimulate sensory and musculoskeletal nerve receptors.⁸ WBV is commonly used to improve balance, muscular endurance, and strength in a variety of patient populations including those with burn injuries.⁹ WBV is also useful in pain management including peripheral neuropathy.^{10,11} A 2013 pilot study by Kessler and Hong¹² evaluated pain reduction from WBV in 12 participants with diabetic neuropathy immediately after each treatment session, for the first 72 hours after sessions, and after 4 weeks of treatment. The participants demonstrated statically significant reductions in pain both during sessions and at the end of a 4 week period based on Visual Analog Scale scores and several variables of the Neuropathic Pain Scale (intense, sharp, sensitive, hot, unpleasant, and deep pain). Length of pain reduction effects after each session also increased from 8.58 hours to 58.2 hours over the 4 week course of the study. However, the Neuropathic Pain Scale did not show significant reduction in "itchy" pain for this population, and there is little research on the phenomenon of pain reduction after WBV in patients with burn injuries.¹²

Previous literature on the use of WBV in people with burn injuries focuses on improving strength, flexibility, and balance in adults.⁹ Only one previous study has evaluated

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