

EFFICACY OF VIRTUAL REALITY AND VISUAL ILLUSION ON NEUROPATHIC PAIN IN SPINAL CORD INJURY: A SYSTEMATIC REVIEW

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ABSTRACT

Background: The international association for the study of pain defines neuropathic pain as “pain caused by a lesion or disease of the somatosensory nervous system.” Neuropathic pain may affect 40-60% of patients with spinal cord injury and is often difficult to treat. Pharmacologic management is typically the first step in treatment, but medications frequently provide only 30-50% improvement in a limited subgroup of patients. Nonpharmacologic treatments are not yet well studied. Virtual reality (VR) and visual illusory (VI) training have been suggested in the management of neuropathic pain.

Methods: A search of PubMed, CINAHL, Scopus, and Embase databases conducted in April 2017, using identical search terms, yielded 38 total articles. Six articles remained following a duplication screen, title screen, and abstract screen, and application of inclusion and exclusion criteria. **Purpose:** The purpose of this systematic review was to assess the evidence concerning VR and VI training in the effective management of neuropathic pain in people with spinal cord injury. **Results:** Following the conclusion of the electronic search and screening process, six articles were chosen for review. Five of the six articles demonstrated that VR and VI had a positive effect on neuropathic pain intensity and quality. **Conclusion:** The inclusion of VR and VI in a rehabilitation protocol may lead to significant reduction in neuropathic pain in patients with spinal cord injury. VI or VR was shown to be a reasonable consideration for alternative neuropathic pain management when compared to the effectiveness of pharmacologic interventions. **Keywords:** neuropathic pain, spinal cord injury, virtual reality, visual illusion

INTRODUCTION

The International Association for the Study of Pain defines neuropathic pain as “pain caused by a lesion or disease of the somatosensory nervous system” at any level of the peripheral or central nervous system.^[1] Neuropathic pain differs from nociceptive pain in that it can occur in the absence of a stimulus or with a normally innocuous stimulus, making the diagnosis process challenging. Neuropathic pain may be classified based on localization of the lesion or disease process, by etiology as either peripheral or central in origin, or by anatomical structure involved.^[2] Causes of peripheral neuropathic pain include diabetic neuropathies, peripheral nerve injury, brachial plexus avulsion, and compressive neuropathies. Primary diagnoses that may result in the presence of central neuropathic pain include, but are not limited to, multiple sclerosis, stroke, spinal cord injury, syringomyelia, and Parkinson’s Disease.^[2]

Damage to the central nervous system is expected to result in sensory loss or negative symptoms, but in clinical practice some patients may present with pain and/or abnormal sensations known as positive symptoms.^[2] These positive symptoms are separated as either unpleasant, named dysesthesias, or not unpleasant, termed paresthesias.^[2] These positive symptoms can manifest as either stimulus-evoked or stimulus-independent pain. Stimulus-evoked pain is either considered as a hyperalgesia, an exaggerated response to a normally painful stimulus, or allodynia, pain produced by a typically non-painful stimulus.^[2] Stimulus independent pain or “spontaneous pain” occurs without a clear provoking stimulus. Symptoms of stimulus-independent pain include both paresthesias, manifested as tingling or itching sensations, and dysesthesias, such as throbbing, shooting, stabbing, or burning sensations.^[2]