Chapter 13
Uses of Virtual Reality (VR) for Chronic Pain

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ABSTRACT

Chronic pain affects many people worldwide with significant individual impact and societal cost. One such area involves the psychiatric co-morbidities associated with chronic pain. Despite its prevalence, the underlying mechanism of chronic pain is not fully understood although evidence suggests the importance of biologic, psychologic, and social factors in the perception of pain. Virtual reality has the potential to be a powerful therapeutic option for chronic pain. This may be due to its impact on attention, emotion, and potentially central nervous system plasticity. Virtual reality therapy has been used successfully for a variety of chronic pain conditions showing its potential. It has also been safely used in pediatric populations. However, the major current limitation is quality of evidence; therefore, future studies should aim to address this issue.

INTRODUCTION

Chronic pain is highly prevalent worldwide but our current understanding of the condition, its influences, and its consequences are not fully understood. Despite this, clinicians and scientists have recognized multiple factors influencing chronic pain including biological, psychological, and social factors (Katz, Rosenbloom, & Fashler, 2015). As understanding of this complex subject has improved, alternative therapeutic methods have been developed to target the various factors believed to play a role in the chronic pain experience. This chapter presents the relationship between chronic pain and mental health, outlines the mechanisms underlying chronic pain and virtual reality (VR) therapy, and then reviews the expanding role of VR in the treatment of chronic pain.

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BACKGROUND

While acute pain has an intuitive role in human adaptation, the role of chronic pain is ill-defined and maladaptive. Initially, biologically-driven theories of chronic pain, such as the gate-control theory, were used to explain chronic pain (Ehde, Dillworth, & Turner, 2014; Melzack & Wall, 1965). Shortly thereafter, researchers began to realize the complexity and multi-faceted issues involved with chronic pain. Observations of the psychologic and social effects of chronic pain became apparent. This led psychologists to apply behavioral and cognitive therapy to these patients (Ehde et al., 2014; Fordyce & Company, 1977). With the success of these therapies, recognition of chronic pain has evolved to encompass the variety of areas it can impact patients’ lives. One way to capture this complexity is describing chronic pain as a perceptual phenomenon, therefore encompassing the biologic, psychologic, and social influences and impacts (Songer, 2005).

Before the next section discusses the biologic component, the following will touch on the equally important psychologic and social aspects. Chronic pain is highly correlated with negative emotions such as depression, anxiety, anger, isolation, and demoralization (Gatchel, Peng, Peters, Fuchs, & Turk, 2007). This can lead to the psychologic impacts described later but can also impact the relationship between patient and healthcare system. These negative emotions impact motivation for treatment and compliance with therapies (Gatchel et al., 2007). Furthermore, patients suffering from chronic pain often deal with repeated failures of treatment, which can lead to frustration and irritation with the healthcare system (Gatchel et al., 2007). This emotional distress is compounded by rejection from the medical system as healthcare providers may label these patients as “complainers” or “symptom magnifiers” (Gatchel et al., 2007). Therefore, the psychosocial components of chronic pain described below should be viewed holistically, keeping mindful of their interconnected relationships.

Evidence that chronic pain is highly comorbid with mental health conditions is strong. In particular, comorbidity with mood disorders and anxiety disorders are prevalent. Large surveys recording 12-month prevalence of comorbid chronic pain and mood disorders are as high as 17.5%, with major depression being the most common comorbid condition (Demyttenaere et al., 2007; Von Korff et al., 2005). In a survey of Canadian patients with chronic pain, over 80% had symptoms of depression, as measured by the Beck Depression Inventory, of which over half were moderate to extremely severe levels (Choinière et al., 2010). Additionally, over one third expressed suicidal ideation. Similarly, these surveys found significant correlations between chronic pain and almost all anxiety disorders. The highest odds ratios were for generalized anxiety disorder (OR 2.6-2.7) and post-traumatic stress disorder (OR 2.6) (Demyttenaere et al., 2007; Von Korff et al., 2005). Patients with chronic pain are also at increased risk of suicidal ideation and death (Hassett, Aquino, & Ilgen, 2014). While some of this is attributed to the psychiatric comorbidities, current evidence supports chronic pain as an independent risk factor for suicide (Ilgen et al., 2013). In addition to these comorbidities, patients suffering from chronic pain are associated with other challenges, including financial, functional, occupational, and psychosocial. A large survey of people suffering from chronic pain, two-thirds had sleep disruption, half had difficulty walking and with household chores, and one-third had a dependent lifestyle (Breivik, Collett, Ventafridda, Cohen, & Gallacher, 2006). Other significant findings included difficulty with sexual relations (40%) and feeling inadequate as a spouse or partner (20%) (Breivik et al., 2006). All of which shows the wide-ranging impact chronic pain has on people’s lives.
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