



Chronic Pain

A Virtual Reality System for Treatment of Chronic Pain & Disability

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Background

Pain is a silent epidemic. An estimated **50 million** Americans live with chronic pain caused by disease, disorder or accident. Additional **25 million** people suffer acute pain resulting from surgery or accident. Approximately two thirds of these individuals in pain have been living with pain for more than five years.

The Need for Improved Treatment of Chronic Pain

Although many treatment options are available for pain management, a survey conducted by the American Pain Society in 1999 revealed that more than four out of ten people suffering moderate to severe pain were unable to find adequate pain relief. Untreated chronic pain has a negative impact on an individual's quality of life, diminishing the ability to concentrate, work, exercise, socialize, and sleep, often leading to depression, isolation and loss of self esteem.

The proposed unique Virtual Reality System is designed to meet the need for quick and effective relief of chronic pain. By enhancing the patient's body schema and body image through cognitive-perceptual stimuli, the system will effectively alleviate chronic pain for millions of chronic pain patients worldwide.

Market

The Virtual Reality System will be targeted at chronic pain patients. The system's annual caseload potential in 2006 comprises of **30 million** severe and moderate chronic pain patients in the USA who are currently underserved by available treatment options.

The Innovation

Recent studies have shown that chronic pain patients suffer from body schema disturbance and negative body image. In addition, these patients tend to avoid various activities due to their fear of pain.



The proposed Virtual Reality System will be designed to reduce pain and disability by presenting patients with cognitive-perceptual stimuli through three major mechanisms:

1. Enhancing body schema, the neurological-spatial online representation of body in space
2. Enhancing body image, the psychological attitude towards the body
3. Reducing pain related fears and avoidance through virtual reality exposure therapy (VRET)

According to the proposed method, patients will view themselves on a computer screen performing various tasks in a virtual environment. The patient will only be required to make a minute motion (to avoid any pain) which then will be translated into a full healthy movement in the virtual environment. Watching the patient's own movements will initiate learning processes which have a curative effect on the disturbed body schema and body image while, reducing pain related fears.

R&D Program

The investigators completed the first prototype for the proposed Virtual Reality System including:

- Developing the basic virtual environment (including avatar and functional tasks)
- Integrating the appropriate interfaces required for operation

- Performing usability tests of the system with healthy subjects

The team has commenced a clinical double-blind experiment with two populations of chronic pain patients: chronic regional pain syndrome patients and post-stroke patients with shoulder-hand pain syndromes.

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