

3D augmented reality applied to the treatment of neuropathic pain

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ABSTRACT

Neuropathic pain is characterized by a permanent or recurrent background pain including stinging, tingling, allodynia, burning, shock or stabbing sensations. It significantly alters the patient quality of life. Such painful conditions are observed in the case of phantom limb pain (PLP) and complex regional pain syndrome (CRPS), and are difficult to treat effectively. Recent studies show the crucial role of the central nervous system in these pathologies and suggest a link to the plasticity of the latter. Mirror visual feedback (MVF) is often used in case of amputation, CRPS or stroke to restore normal cortical organization and to lower pain intensity. We have conceived an augmented reality (AR) system that applies the principle of MVF without requiring the use of a physical mirror. The system strengthens the patient's immersion and concentration by using realistic, natural looking 3D images that are acquired, processed and displayed in 3D, in real time. Our system is based on standard inexpensive hardware and is easy to install and to use. This makes it perfectly suitable for use in a therapist's practice or at home. The preliminary results of clinical tests show that the system can significantly reduce the pain, after only a few training sessions.

Full papers will be published in the Conference Proceedings and will be available to delegates at the conference on Sept. 10.

Full papers will be released on-line in the ICDVRAT archive on March 15.