Combining virtual reality and a myo-electric limb orthosis to restore active movement after stroke: a pilot study

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ABSTRACT

We introduce a novel rehabilitation technology for upper limb rehabilitation after stroke that combines a virtual reality training paradigm with a myo-electric robotic limb orthosis. Our rehabilitation system is based on clinical guidelines and is designed to recruit specific motor networks to promote neuronal reorganization. The main hypothesis is that the restoration of active movement facilitates the full engagement of motor control networks during motor training. By using a robotic limb orthosis, we are able to restore active arm movement in severely affected stroke patients. In a pilot study, we have successfully deployed and evaluated our system with 3 chronic stroke patients by means of behavioral data and self-report questionnaires. The results show that our system is able to restore up to 60% of the active movement capacity of patients. Further, we show that we can assess the specific contribution of the biceps/triceps movement of the paretic arm to the virtual reality bilateral training task. Questionnaire data show enjoyment and acceptance of the proposed rehabilitation system and its VR training task.

Full papers will be published in the Conference Proceeding s 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.