

From lab to clinic : towards a virtual reality platform for routine clinical rehabilitation

Lindsay J Millar, Philip J Rowe

Department of Biomedical Engineering, University of Strathclyde

Background: Recent advances in technology have led to the widespread commercialisation of virtual reality (VR). Many researchers have investigated the use of VR for rehabilitation; however few have extended VR use into routine clinical practice. This is mainly due to systems being too complex and time consuming or too simple to provide necessary information regarding patient function.

Aim: Develop a VR platform that can provide an objective measure of patient function and can be integrated into clinical practice with minimal disruption to routine care.

Method: Motion analysis is currently the gold standard for non-invasive measurement of human movement and therefore was implemented in this study to provide an objective analysis of function. A bespoke, cluster based protocol was developed and used to create an avatar and three feedback scenarios for standard orthopaedic rehabilitation exercises (step up, sit to stand, weight transfer). A cohort study was carried out in a hospital clinic with 15 control and 15 intervention orthopaedic rehabilitation patients to assess the effectiveness of feedback and the integration of the system into routine practice.

Results/Findings: Visual feedback was successfully delivered using motion capture with minimal disruption to routine practice. Further, provision of feedback may have a positive effect on knee sagittal RoM, although larger scale studies are required to confirm these findings.

Discussion and Conclusion: Use of a motion analysis protocol which was designed for purpose allowed integration of the system into routine practice. There was minimal disruption to patient care and use of the system may improve functional outcome of orthopaedic rehabilitation patients.