# Randomised, controlled feasibility study of immersive virtual reality in upper limb rehabilitation in MS; A protocol

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Virtual reality (VR) has reported benefits of engagement and motivation in rehabilitation and has been proposed to be a solution for long-term engaging rehabilitation methods. However, protocols are inconsistent and the use of VR within the multiple sclerosis (MS) population is not widely investigated, especially using immersive VR that utilises headsets. We have developed a protocol for a randomised controlled feasibility study using interactive and immersive VR (Oculus Quest headset) and gamified exercises for upper limb rehabilitation in people with MS. The study will be a two-arm randomised controlled feasibility trial that aims to recruit 30 people with MS who have self-reported upper limb dysfunction to either a VR intervention group or a control group receiving usual care. The VR intervention group receive eight weeks of twice weekly, 30-minute sessions per week using the Oculus Quest headset to play immersive VR games that have been designed by co-production with people with MS and MS-specialists. Both groups will undergo the following outcome measures at baseline, week four and week eight: nine-hole peg test; ABLIHAND questionnaire; hand grip strength; Action Research Arm test; and spasticity quality of life tool. The intervention group will complete a USE questionnaire regarding the usability of the games and five participants will take part in semi-structured interviews to express their experiences using VR and make suggestions for improvements. As this is a feasibility trial, data will also be collected regarding the recruitment of participants, user compliance by drop-out rates and session completion, and adverse effects. Due to COVID each participant will be assigned their own headset throughout the duration of the intervention. This study, due to begin in May 2022, will investigate the feasibility of using immersive VR for people with MS for their upper limb rehabilitation, the results of which will be used to support for future fully-powered trials.