# Robotic/virtual reality intervention program individualized to meet the specific sensorimotor impairments of an individual patient: a case study

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## ABSTRACT

A majority of studies examining repetitive task practice facilitated by robots for the treatment of upper extremity paresis utilize standardized protocols applied to large groups. Others utilize interventions tailored to subjects but don't describe the clinical decision making process utilized to develop and modify interventions. This study will describe a virtually simulated, robot-based intervention customized to match the goals and clinical presentation of a gentleman with upper extremity hemiparesis secondary to stroke. MP, the subject of this case, is an 85 year-old man with left hemiparesis secondary to an intracerebral hemorrhage five years prior to examination. Outcomes were measured before and after a one month period of home therapy and after a one month virtually simulated, robotic intervention. The intervention was designed to address specific impairments identified during his PT examination. When necessary, activities were modified based on MP's response to his first week of treatment. MP's home training program produced a 3 second decline in Wolf Motor Function Test (WMFT) time and a 5 second improvement in Jebsen Test of Hand Function (JTHF) time. He demonstrated an additional 35 second improvement in JTHF and an additional 44 second improvement in WMFT subsequent to the robotic training intervention. 24 hour activity measurement and the Hand and Activities of Daily Living scales of the Stroke Impact Scale improved following the robotic intervention Based on his responses to training we feel that we have established that, a customized program of virtually simulated, robotically facilitated rehabilitation was feasible and resulted in larger improvements than an intensive home training program in several measurements of upper extremity function in our patient with chronic hemiparesis.