Abstract

There are several technologies that can be used to measure body movement, from accelerometers to video-based motor capture. However, robotic technologies, either grasped by a subject or directly attached to the limb, have an additional advantage in that they can apply loads to disturb body motion allowing us to probe properties of the motor system by observing how it responds to these unexpected disturbances. I will highlight how we use robotic technology (guided by advanced control theory) to quantify how humans can generate complex goal-directed motor corrections in as little as 60ms, as well as complementary studies in non-human primates that demonstrate how frontoparietal circuits support this fast feedback process. As well, will also describe our clinical studies that use this same robotic platform to quantify sensory, motor and cognitive impairments associated with a variety of neurological injuries and disease. In particular, I will describe how stroke commonly impairs the ability of individuals to use sensory information to generate rapid goal-directed motor corrections.