

ABSTRACT
IDENTIFICATION OF NEURAL DEFICITS ASSOCIATED WITH UPPER
EXTREMITY DYSFUNCTION IN PERSONS WITH
MULTIPLE SCLEROSIS

Julie C. Wagner

Marquette University, 2024

Multiple Sclerosis is a demyelinating neurodegenerative disease prevalent in approximately 2.8 million people worldwide. Two

brushing teeth or working on a computer. Currently there is little consensus as to how the underlying functional neural interactions manifest as upper extremity dysfunction in PwMS. This dissertation aims to better understand the disruption in neural pathways which mediate sensorimotor control during visually guided reach to identify common deficits across levels of upper extremity impairment in PwMS. To do this, PwMS and

neural response in PwMS with more and less impairment via decreased amplitude and latency respectively. During no movement phases more reliant on visual feedback processing increased functional connectivity of sensory processing regions is common across PwMS but those with greater motor impairment also have motor processing correlates to behavioral measures of dysfunction. Finally increased demand on sensory processing regions throughout no movement help mitigate motor deficits for less impaired PwMS while those with more impairment require additional recruitment from sensory, motor, and frontal regions to complete a visually guided no movement. These results can be used to facilitate future rehabilitative efforts in reducing motor impairments in PwMS.