

Joint Biomedical Engineering Seminar Series

MU ▪ MCW ▪ UWM

Friday, November 18th, 2016

Noon-1pm

Olin Engineering 202

Marquette University

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Abstract

Debugging Clinical Sensory Assessments using Robotics: Implications for Rehabilitation of Individuals with Stroke

Findings based on currently available clinical sensory assessments indicate that half of ~8.4 million US stroke survivors living in 2030 will need rehabilitation for an impaired awareness of their arm's location in space (i.e., proprioception). In this presentation, I will show that clinical evaluations made when using current state-of-the-art proprioceptive assessments can be misleading and that, in turn, rehabilitative interventions may not be optimized for a large number of stroke survivors. The long-term goal of this work is to deliver more targeted and effective patient-specific rehabilitative treatments by identifying which neural mechanism causes which impairments in individuals with stroke. My goal in this talk is to highlight the need for new assessments that can accurately diagnose the reason for observable impairments in individuals with stroke so that we can then determine which individuals with stroke need what type of rehabilitation for their given impairments.

To begin, I will provide an overview of state-of-the-art clinical proprioceptive assessments and will identify shortcomings of these assessments in their ability to identify proprioceptive impairments. Then, I will present results from numerous behavioral experiments in which we used robotic assessments to quantify the ability of individuals with chronic hemiparetic stroke to identify the location of their arms in space.

Results from these experiments indicate that judgements about whether individuals with stroke have proprioceptive impairments can depend on how an assessment is executed (e.g., passive versus active movement, within arm versus between arms task); in turn, these results demonstrate that clinical evaluations made based on clinical assessments can change depending on the design of the assessment.

Last, I will discuss the implications of our findings. In particular, I will highlight a need for the development of more accurate clinical assessments that can determine the reason for observable sensorimotor impairments in individuals with stroke.

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Olin Engineering Center is located at 1515 W. Wisconsin Ave, Milwaukee, WI. Parking is available in Structure 1 on 16th Street between Wisconsin Ave. and Wells Ave. Refreshments will be served.