Department of Biomedical Engineering
UNIVERSITY OF WISCONSIN–MADISON

Spring 2020 Seminar Series

Targeted robotic gait training improves walking in individuals post-stroke

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Associate Professor; Bioengineering; University of Illinois at Chicago

Big 10 Speaker Exchange

The objective of this study was to test whether the efficacy of locomotor training would be improved through the application of constraint induced forced use of the affected leg during locomotor training. Locomotor training using a treadmill is a promising technique that provides a safe and convenient environment for improving walking capability in individuals post-stroke. While the improvements in walking function after treadmill training are statistically significant, the functional gains are relatively small for many patients. One of primary reasons of the less effectiveness of treadmill training may be due to the compensatory motor strategies employed by patients during locomotor training, i.e., patients with hemiparesis often rely more on the unaffected leg for performing bipedal walking during treadmill training. Repetitive practice in this manner may actually lead to reinforcing the compensatory motor strategies, which results in limited improvement in motor control of the affected leg, resulting in limited functional gains after training, which suggests a need of developing new training paradigms in order to maximize functional gains. Constraint induced movement therapy (CIMT) has been utilized to improve motor function of the affected arm in individuals post-stroke through forced use of their affected arm and by restricting movements of the unaffected arm. However, such interventions have not been effectively applied to lower limb training in individuals post-stroke due to the coupling between the two legs during bipedal gait and the risk of falling. Thus, we proposed to develop a new strategy to test CIMT for lower limb training in individuals post-stroke. Specifically, we applied a controlled force to the pelvis and/or unaffected leg, which served to overcome the compensatory motor strategies employed by patients, and induced a forced use of the affected leg during locomotor training. Results from this study may lead to an innovative clinical therapy paradigm aimed at improving locomotor function in individuals post-stroke.

ABOUT the SPEAKER

Dr. Ming Wu obtained his PhD from the Tsinghua University, Beijing, in 2003 and completed his Post-Doc training at the Rehabilitation Institute of Chicago (RIC) and Northwestern University, from 2003-2006. Since then, he is a Research Scientist at the Shirley Ryan AbilityLab (formerly RIC), and a research faculty member of the Department of Physical Medicine and Rehabilitation of Northwestern University. In 2018, he joined the University of Illinois at Chicago as a faculty member of the Department of Bioengineering, and he still holds his position as a Research Scientist and is conducting his research at the Shirley Ryan AbilityLab. He is the Director the Laboratory of Engineering for Gait Science (LEGs) at the Rehabilitation Institute of Chicago. His research interests focus on the development of new robotic technologies for improving walking function and balance of patients post stroke, spinal cord injury, and children with cerebral palsy. He is currently working on two NIH funded projects.

Monday, March 2 at noon
1003 Engineering Centers (Tong Auditorium)