EXAMINING DEFICITS OF SENSORIMOTOR LEARNING AND PERFORMANCE AFTER CONCUSSION IN THE STUDENT ATHLETE

Activity	Balance	Motor Memory
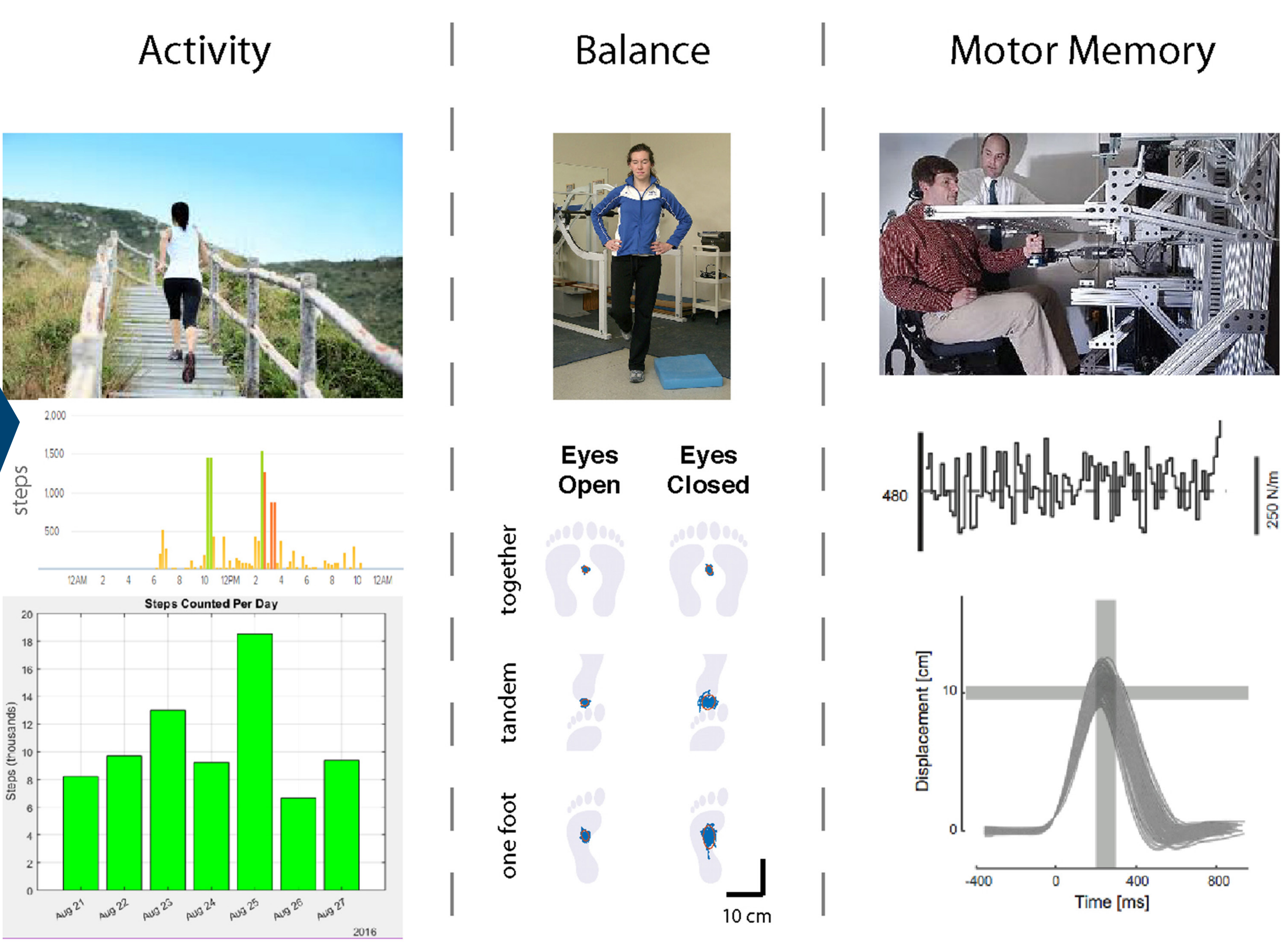
SUMMARY

Recovery of memory and attention after concussion: a new test that cannot be "gamed" by individuals seeking faster RTP.

DESCRIPTION

This project is a longitudinal, prospective, controlled study wherein we characterize the time course and extent of recovery from concussion both in terms of resolution of symptoms (headache, photo-sensitivity, sleep issues, sadness) and in terms of sensorimotor performance and memory-based learning. Whereas the use of activity / symptom logs, AXON testing and balance tests is standard in studies of concussion, our project is unique in its additional use of rehabilitation robotics to quantify sensorimotor memory deficits and their resolution over time in the concussed brain.

MILESTONES

Summer - Fall 2016
Project Startup; IRB submission; equipment programming and pilot data collection

Winter 2016 - Fall 2017
Human subjects experimentation

Spring - Winter 2017
Data analysis

Spring - Summer 2018
Conference presentation; manuscript submission; grant proposal preparation and submission

ABOUT OUR TEAM

Robert A Scheidt, PhD, Principal Investigator: Biomedical Engineering / Neuroscience
Leigh Ann Mrotek, PhD, Research Scientist (Neuroscience)
Carolyn Smith, MD, Executive Director, MU Medical Clinic–Concussion Specialist
Danny Thomas, MD, MPH, Pediatrician/Emergency Medicine–Concussion Specialist
Hannah Moody, MS, LAT, CES, Athletic Trainer/Physician Extender – Concussion Specialist
Scott Beardsley, PhD, Scientific Consultant – Perceptual Learning
Iqbal Ahamed, PhD, Scientific Consultant – Informatics
David Leigh, MS, Clinical Consultant - Concussion
Devon Lantagne, Doctoral Student
Becca Slick, Undergraduate Intern

Dr. Scheidt has expertise in neuromotor control and learning. He designed the robotic test procedures we use to quantify post-concussion recovery of sensorimotor memory and prediction. He ensures that project goals are achieved in a timely manner.

BEYOND BOUNDARIES

Sport-related concussion causes deficits of memory and attention that can impair motor learning and lead to persistent cognitive and sensorimotor performance deficits. This project seeks to understand how deficits of memory and attention resolve during recovery from concussion. We will test how variations in the amount of low-risk activity influence recovery using standard neuropsychological and balance tests in addition to novel procedures that quantify how memories from past actions guide future motor behavior. This project advances the mission of Marquette University by involving faculty, staff and students in the pursuit of academic excellence for human well-being through research in action.

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Research