2014 UPDATE

From the Directors

2014 has been a most eventful year for TCNL, including research ranging from proof-of-concept (wheelchair-stage multiple sclerosis) to translational (pre-clinical trials in traumatic brain injury), to new measurements and data acquisition tools. To support these efforts, TCNL added two fulltime staff and four students for a year-end team including 13 members. 2015 promises additional changes including both physical and administrative moves. Stay Tuned!

From the Therapy Team

During 2014, Kim Skinner, Director of Therapy, expanded her team with physical therapists Janet Ruhland and Georgia Corner. Both are licensed physical therapists with backgrounds that include years of research. They work with subjects in our mild-to-moderate TBI study and advanced MS study. As Ruhland and Corner have learned about PoNS application and the therapeutic approach of the TCNL, the team has created and honed materials that will be used to train therapists at other study sites. We have also been adapting the TCNL therapeutic approach for our subjects with advanced MS, and are experimenting with outcome measures that can meaningfully capture the physical capabilities of these subjects.

Watch for our next move

TCNL is on the move again! Early in 2015 the lab will be moving to a new location in University Research Park. The new location will allow additional flexibility to accommodate the current clinical trial and the transition of the lab to a more independent status.

Watch for more news online at: tcnl.bme.wisc.edu/forward

TCNL featured in new book release


For more information: www.normandoidge.com

Traumatic Brain Injury Study Recruiting Subjects

- Mild to moderate TBI with balance and walking difficulty
- No loss of conciousness greater than 24 hours
- 26 week study
- Compensation available
- Must meet additional eligibility requirements
- Please see website for details: go.wisc.edu/124mx8

Physical Therapists: Janet, Kim, and Georgia
Traumatic Brain Injury  A new TBI Study enrolled its first subject in June 2014. This is TCNL’s first randomized controlled trial investigating the reduction of balance and gait impairments caused by TBI. The study will use the new PoNS 2.5 device (detailed below). The development of training materials for both clinician and subject/patient will lead to replication studies at other sites, and serve as a model for creating similar materials pertinent to other neurological conditions. Without the generous gifts to the UW Foundation and the partial funding from the US Army, this study would not have been possible. This study is actively recruiting new subjects with a target enrollment of 44 participants, and will incorporate functional magnetic resonance imaging (fMRI) to explore the neurophysiological mechanism underlying CN-NINM therapy.

We expect to launch three external TBI studies early in 2015 (coordinated with the US Army), aimed at improving the transferability of and access to CN-NINM technology and methods. The sites will include Orlando Regional Health Center, Oregon Health Sciences University/ Portland Veterans Administration Hospital, and the Montreal Neurological Institute.

Multiple Sclerosis  We began a study in people with advanced Multiple Sclerosis. We are excited to see improvement in this very difficult to treat population. Subjects demonstrated improved seated posture, transfers, and movement control. This study made us aware of the inadequacy of current measurement tools for those in this “wheelchair-stage” population. As a result, our physical therapists are developing potential new measurement tools that can objectively measure subject improvements.

Stroke and Parkinson’s Disease  Internal lab studies are open but continue at a slower pace due to limited resources. We are not currently recruiting for these two studies. TCNL and Baylor Research Institute (Dallas, TX) are discussing a pilot study (10 subjects) at Baylor to investigate the transferability of our PD methods to an external site.

Instrumentation  The PoNS version 2.5 was used for the first time in the TBI study. The new device logs time of use by subjects during their home therapy exercise, which allows us to monitor compliance. The device also provides an improved placebo mode that reduces a possible experimental confounding factor.

Publications and presentations  include 1 journal paper, 1 invited book chapter, and 4 conference presentations. Please visit our website for a complete listing. tcnl.bme.wisc.edu/library

Measurement Tools  Video Nystagmography, the measurement of gaze stability and tracking (impaired in many neurological disorders) has been incorporated into all of our active studies. We are in the process of developing new software for efficient analysis of the large volume of data and are exploring whether this software may become a stand-alone diagnostic tool.

In this example, eye position was recorded by an infrared videonystagmography system, sampling rate 100 Hz, during a spontaneous nystagmus test. The subject fixed their gaze at the target, located in the center of the screen, during 15 seconds (red dots) and then maintained their gaze in the same position during 15 seconds after target was removed from the screen (blue dots). The distribution of eye position on the screen is presented as a 2D scatterplot, separately for left (LE, left column) and right (RE, right column) eyes, recorded before (upper row) and during CN-NINM therapy – after 4 (second row), 43 (third row) and 81 (fourth row) days. The bottom, post treatment panels demonstrate more precise focus and better ability to maintain gaze.
Focus on Students

Four new students are helping in the development of methods for eye movement analysis, physiological data recording, documentation of study results, and instrumentation testing. Former student Nicole Hangsterfer was accepted into the Physician Assistant program at Northwestern University, and Swetha Srinivasan and Gayatri Vishwanathan were successful in obtaining internship positions.

As a result of our ongoing internal collaborations, biomedical engineering PhD student Carrie Francis has received a three-year predoctoral fellowship from the National Institutes of Health to support her research into the efficacy of non-invasive neuromodulation stimulation via the cranial nerves to enhance gait and postural balance in older adults. Francis’ research specifically aims to mitigate older adults’ risk of falls. The technique originated in TCNL.

In addition, two mechanical engineering graduate students, studying under Professor Darryl Thelen, are involved in our TBI study.

Thank You!

The list of people we can thank is almost endless, but we in particular want to recognize:

University of Wisconsin-Madison: Thanks especially to Professors Beth Meyerand, Vivek Prabhakaran, and Darryl Thelen for research collaboration, administrative support, and support with student mentoring. Thank you also to the entire Department of Biomedical Engineering and the numerous UW leadership and administrative faculty and staff who have supported our lab’s mission.

US Army Medical Research & Materiel Command: Thanks to Dallas Hack (COL-retired), Ian Dews (MAJ), Scott Colmyer, and Brian Dacanay for leadership, research collaboration, project organization, technology transfer, and financial support.

Our donors: Thanks to all who have supported TCNL with gifts through the UW Foundation, especially Pamela & George Hamel, and Tammy & Neil Barry. Thanks also to hundreds of anonymous donors. If you have made a gift to TCNL and want to be recognized on our website (http://tcnl.bme.wisc.edu/donate), please contact Ann Pahnke, apahnke@wisc.edu. We only post your name with your approval.

Note: As explained in the enclosed letter, TCNL is not able to accept gifts at this time. When we are again able to accept gifts, we will send out a notice to our supporters as well as provide information on our web site.

Special mention: We especially appreciate Norman Doidge for supporting our lab’s mission through devoting significant space in his two books to our lab’s research activities. We also thank Sanjay Arora for assistance in establishing a collaborative research study at Rush University Medical Center in Chicago.

Staff

TCNL Co-Directors
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* not in picture