CABRR SEMINAR SERIES
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Functional Response to Innovative Gait Training and Upper Limb Training After Stroke

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Abstract: The long-term goal of the research is to elucidate the motor and cognitive processes involved in motor re-learning following stroke, with recent emphasis on identification of the cortical processes required to drive more normal motor behavior. Our research efforts have produced innovative gait training interventions that, in randomized controlled trials, showed clinically and statistically significant advantage compared to otherwise comparable and comprehensive gait training interventions, including weight-supported treadmill training. We have developed measures of lower limb coordination in order to begin to investigate underlying mechanisms that might be driving restoration of the coordinated movements that compose the gait pattern. Video documentation of pre- and post-treatment gait patterns will be shown in order to illustrate and supplement study data.

In a small, randomized controlled trial, we have shown good upper limb functional response to both upper limb robotics and FES using surface electrodes in stroke survivors. Video documentation will be shown to illustrate and supplement study data. The studies currently underway include the study of central nervous system structural and functional change in response to innovative application of technologies and motor learning. Our investigation includes the use of fMRI and EEG measures of cortical function. Preliminary data showed elevated cortical effort level and prolonged cortical planning time in stroke survivors for both simple and complex upper limb tasks. A preliminary case series study showed improved cortical effort level and cortical planning time in response to upper limb functional training.

Dr. Daly received a Bachelor’s degree in Biology from Oberlin College, a Master of Science degree in Physical Therapy from Case Western Reserve University, and a Ph.D. in Psychology from the University of Akron. She has developed clinical, academic, and research programs. She was co-founder (one of six) of the multi-disciplinary Mellen Center for Multiple Sclerosis at the Cleveland Clinic Foundation and was founder and chairman of a graduate masters degree program in physical therapy. She is currently Director, Stroke Motor Control/Motor Learning Laboratory, and Associate Director, Cleveland FES Center of Excellence (Associate Director). Her academic affiliation is with the Department of Neurology, Case Western Reserve University School of Medicine (Associate rank). She has developed a funded research program in innovative interventions for stroke rehabilitation, and leads an inter-disciplinary full-time research team of therapists, physicians, and engineers. Her research program is supported by the Department of Veterans Affairs.