Category: FES, Brain Stimulation and Neurophysiology

Workshop Title: Advances in Electrical Stimulation Therapies After Spinal Cord Injury

Workshop Organizer(s): David Dolbow

In person Speaker(s):

- Davis, Glen, PhD, Clinical Exercise Sciences, School of Health Sciences, University of Sydney, Sydney, Australia
- Dolbow, David, PT, DPT, PhD, Physical Therapy Department and College of Osteopathic Medicine, William Carey University, Hattiesburg, MS, USA
- Gorgey, Ashraf, PT, MPT, PhD, Spinal Cord Injury and Disorders Center, Hunter Holmes McGuire VA Medical Center, Richmond, VA, USA, College of Medicine, Virginia Commonwealth University, Richmond, VA, USA
- Bersch, Ines, PT, PhD, International FES Centre®, Swiss Paraplegia Center, Nottwil, Switzerland

Workshop Time: 08:15 - 09:45

Attendee Engagement:

The presenters will introduce recent advancements in evidence-based electrical stimulation therapies for individuals with spinal cord injuries. Videos of the various electrical stimulation therapies will be provided for lower extremity activities as well as an live in-person demonstration of diagnostic and rehabilitation FES techniques for various upper extremity conditions after spinal cord injury. Speakers will utilize “Mentimeter”, a presentation tool that allows audience interaction during the presentations.

The second part of the session will involve a panel discussion moderated by David Dolbow. The speakers will synthesize the information shared in the presentation and discussions between the attendees and presenters will be guided by audience input. Audience participation in this process will be facilitated through Mentimeter.

This workshop will have special relevance to the Asian Clinical Track of ARMA-MARP who will attend IFESS.

Abstract:

Electrical stimulation exercise has become an important modality to help improve the mobility and overall health of individuals with spinal cord injury (SCI). Electrical stimulation, such as functional electrical stimulation (FES), neuromuscular electrical stimulation (NMES) is commonly used to stimulate peripheral nerves in the lower extremities to assist with muscle strengthening or the performance of functional activities such as cycling, rowing, and walking. In addition, electrical stimulation of the peripheral nerves in the upper extremities has become a valuable diagnostic tool for predicting the risk of hand deformities and rehabilitating functional grasping activities in people with tetraplegia. It is precisely here that the targeted use of direct muscle stimulation (long-pulse

stimulation in the denervated muscles is necessary in order to influence morphological properties and not to impair the neurophysiological behavior of the neighboring muscles. There is growing evidence that these activities can improve physical fitness and overall health, improve functional mobility, and decrease the risk of cardiometabolic conditions associated with inactivity. Studies involving non-invasive stimulation of the spinal nerves via external electrodes aligned with the spinal cord and more invasive stimulation of electrodes implanted in the epidural lining of the spinal cord have been shown to increase the ability to stand and to enhance the stepping pattern during ambulation. Furthermore, the application of this technique in the cervical spinal cord may enhance function and dexterity of upper extremities. As the evidence continues to grow it is important to remain abreast of the latest advances so that current rehabilitation practices are optimized by evidence-based protocols.