A Two Day Master Class

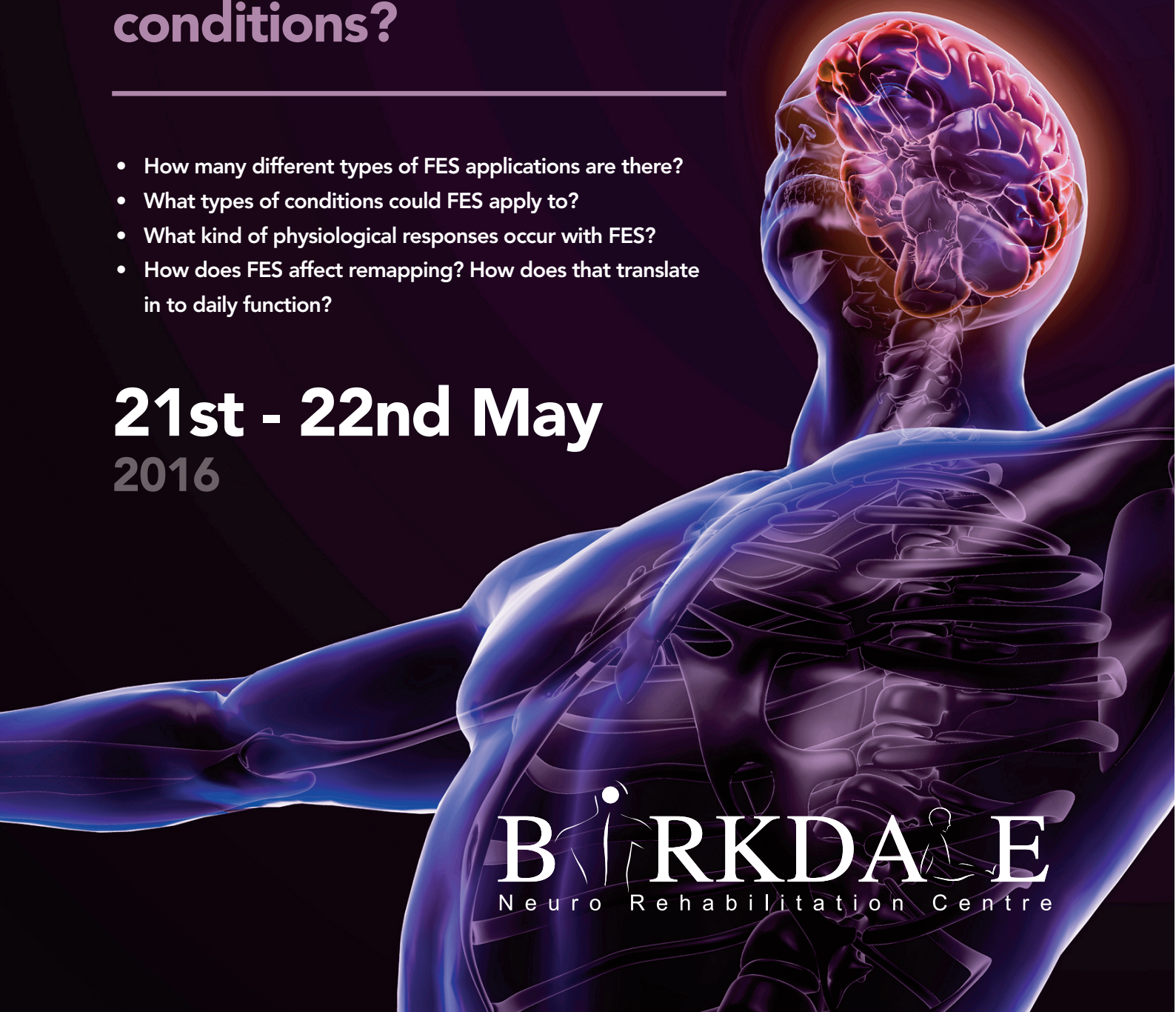
with

Prof Daniel Becker &
Prof Diego Centonze

Why and how does FES enhance recovery in central nervous system conditions?

- How many different types of FES applications are there?
- What types of conditions could FES apply to?
- What kind of physiological responses occur with FES?
- How does FES affect remapping? How does that translate in to daily function?

21st - 22nd May 2016



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Why and how does FES enhance recovery in central nervous system conditions?

Fee: £250.00

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Dr. Daniel Becker

Dr. Daniel Becker is an Assistant Professor at the Johns Hopkins University School of Medicine, in the Department of Neurology, Division of Neuroimmunology and Neuroinfectious Diseases. He is the Director of the International Neurorehabilitation Institute in Lutherville, MD. Dr. Becker is a Board Certified Neurologist with Subspecialty Board Certification in Spinal Cord Injury Medicine. He is also a Board Certified Disability Analyst.

He earned his Medical Degree from Ruprecht Karls University in Heidelberg, Germany in 2001. From 2001 to 2003, he was a Research Assistant in Neuroscience investigating the role of embryonic stem cells in spinal cord injury repair at Washington University School of Medicine in St. Louis, Missouri. At Vanderbilt University Medical Center in Nashville, Tennessee, he completed his residency in Internal Medicine in 2004 and his residency in Neurology in 2007. From there, he completed a fellowship in Spinal Cord Injury Medicine at the Johns Hopkins School of Medicine in Baltimore, MD in 2008. In 2008 he became an active member of the Johns Hopkins Transverse Myelitis Center as part of the Johns Hopkins Neuroimmunology Division as well as the Neurophysiology Intraoperative Monitoring Division. He was the Director of the Pediatric Spinal Cord Injury Unit at Kennedy Krieger Institute in Baltimore, MD from 2008 to 2013. In 2013 Dr. Becker was named the Director of the International Neurorehabilitation Institute in Lutherville, MD.

Additionally, Dr. Becker is the Principal Investigator at Johns Hopkins on several clinical trials, which attempt to understand the causes and evaluate treatment strategies for individuals suffering from transverse myelitis, multiples sclerosis, traumatic spinal cord injury, and related disorders. His research has been published at numerous national and international meetings as well as in many journals and books, including Neurology, The Journal of Child Neurology, The Neurologist, Journal of Neurotrauma, Experimental Neurology, and the books Principles of Tissue Engineering and Essentials of Stem Cell Biology.

Abstract:

Title: "Why does FES enhance recovery in central nervous system conditions?"

In patients with central nervous system (CNS) injury, a novel way of increasing activity in the injured CNS is Activity Based Rehabilitation (ABR). ABR interventions include functional electrical stimulation (FES), locomotor training, weight loading, patterned and non-patterned motor and sensory activation above and below the level of spinal lesions. FES has been associated with improved spasticity, motor control, bladder function, gait, upper extremity dexterity, and quality of life. Further, analysis of cerebrospinal fluid before and after FES revealed an enhanced neural repair program and a reduced inflammatory environment within the CNS. The exact mechanism, by which these changes occur, is not well understood yet. Inhibition of excessive spinal reflex activity, augmentation or modulation of ascending and descending tracts, and modulation of the central excitatory state and neurotransmitter release have been proposed. Dr. Becker will discuss leading theories about the effects of FES on the injured CNS.

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Prof Diego Centonze

Prof Diego Centonze is Full Professor of Neurology at the Department of Systems Medicine of the University of Rome Tor Vergata and Head of the UOSD Multiple Sclerosis Clinical and Research Centre at Tor Vergata Hospital. He leads the Laboratory for non-invasive brain stimulation at Tor Vergata Hospital, the Experimental Neurology Laboratory at Tor Vergata University and the Neuroimmunology and Synaptic Plasticity Laboratory at Fondazione Santa Lucia/CERC in Rome. His major clinical interest involves the evaluation of new drugs for the treatment of MS. His research interests are related to the role of synaptic transmission and plasticity in the pathophysiology of Multiple Sclerosis and of its experimental model, and to the physiology of the endocannabinoid system and its involvement in inflammatory neurodegenerative diseases. Prof. Centonze graduated in Medicine at the University of Rome La Sapienza in 1994, specialised in Neurology in 1999 and in Psychiatry in 2006 at the University of Rome Tor Vergata. He obtained his PhD in Rehabilitation Medicine in 2012. He is Principal Investigator of many phase II, III and IV national and international trials with new therapeutic agents for MS. He is also Expert Consultant of the European Medicine Agency for MS. He is Member of the Society for Neuroscience, the Italian Neurological Society (SIN) and the Italian Neuroscience Society (SINS). Prof. Centonze is author of around 290 peer-reviewed papers published in international journals of Neuroscience, Neurology and Psychiatry.

Abstract: Promoting synaptic plasticity with non-invasive brain stimulation to enhance recovery of function in multiple sclerosis

Diego Centonze (Tor Vergata University, Roma, Italy

Clinical expression of brain damage varies over time and among individuals. This is particularly evident in multiple sclerosis (MS) where the expression clinico-radiological paradox has been coined to indicate the weak association between common neuroradiological markers of MS and clinical disability. Recent data suggest a possible role of adaptive synaptic long-term potentiation (LTP) in the clinical course of MS. We propose that the capacity of the brain to potentiate synaptic excitability in a long-lasting way is the brain's core adaptive property to bridge neuronal damage and clinical expression in MS. LTP, in fact, consists in the strengthening of synaptic communication between two connected neurons, and is virtually able therefore to restore membrane excitability of neurons that have lost part of their synaptic inputs. Consistently, recent studies have shown that cortical LTP reserve, explored through transcranial magnetic stimulation (TMS), contrasts disability progression in MS. Promotion of cortical LTP through exercise therapy or TMS induces cortical remapping and ameliorates symptoms of MS. Along with its ability to enhance plasticity and recovery of function, exercise also interferes with inflammation-driven neuronal damage, and might therefore have disease-modifying properties in patients with MS.

Dr Salim Ghoussayni

Dr Salim Ghoussayni has extensive experience in researching, developing and implementing functional electrical stimulation and gait rehabilitation technologies. Dr. Ghoussayni completed his PhD in Biomedical Engineering at the University of Surrey, where he was appointed lecturer in 2005 and currently acts as a Visiting Senior Fellow. Two of his main areas of research interest are gait analysis and rehabilitation using electrical stimulation. Dr. Ghoussayni joined Ottobock in 2010, and though the research and development have been very rewarding tasks, he finds it equally satisfying to be able to play an active part in the training, education and support of clinicians in successful implementation of neuro-rehabilitation technologies.

Abstract: "An introduction to the principles and latest innovations in external and implantable FES devices for drop foot, their application and supporting clinical evidence."

Neurological impairments impacts on motor control, strength, and stability, sensory and proprioceptive input during gait, causing compensatory measures to be adopted altering the biomechanical alignment during the gait cycle. These secondary complications will ultimately affect gait where graded dynamic movement and stability is required.

Advancing technological solutions in Functional Electrical Stimulation (FES) may be utilized to treat some of the challenging impairments of neurological gait abnormalities that impacts locally at the target muscles and also within the Central Nervous System.

In this presentation we will investigate how Functional Electrical Stimulation, can help manage some of these commonly associated impairments using single, dual and implantable FES systems.

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Lynn Vale

Lynn Vale graduated with a BSc Hons Degree in Physiotherapy from the University of Southampton in 2000. Following her rotations she specialised in neurology, in both the acute and rehabilitation settings within the NHS. Her primary interest is the use of rehabilitation technology and how advancing technology in the field can be used to promote and enhance the recovery of individuals suffering from a CNS pathology or disease.

In 2009 Lynn went to work as Clinical Specialist for a company dedicated to Functional Electrical Stimulation (FES), working with technology that offers solutions to treat both upper and lower limb paralysis secondary to CNS pathologies. She then went on to develop experience in the rehabilitation exoskeleton sector, working with Spinal Injury units across the UK and Europe providing training and clinical support.

Lynn is now a Clinical Specialist for Ottobock in the field of surface neurostimulation. She provides education and clinical support for FES in the UK for both the private and NHS sectors, with the objective of promoting awareness of FES technologies to both health professionals and individuals who may benefit from the technology.

Farshideh Bondarenko

Farshideh Bondarenko is NHS trained and qualified (1977), she has worked in many centres of neurological excellence, including The National Hospital for Neurology, Great Ormond Street Hospital and Cheyne Hospital.

In 1987, she set up The Birkdale Clinic, responding to the demand – that the NHS cannot afford to fulfil – for more long term, consistent, intervention to improve a client's quality of life.

Farshideh studied, and continue to, a broad range of physical therapy approaches, including Bobath, Peto, Carr and Shiatsu with many of the leading exponents of these disciplines.

She has developed an effective and innovative approach to complex neurological presentations in both the adult and paediatric populations that may be tailored to each individual.

Her area of special interest lies with children and young adults. She has extensive experience of most childhood conditions and their integration with family life over long time periods.

Farshideh is a member of the Chartered Society of Physiotherapy (MCSP) and also of the Organisation of Chartered Physiotherapists in Private Practice (OCPPP) and the Association of Chartered Physiotherapists in Neurology (ACPIN).

Abstract: "Effect of FES on Sensory Motor Skills"

She is very interested in the integrating the role of sensory modalities in daily life. In this conference her aim is to emphasise the importance of the role of sensory /motor skills and how the use of FES improves hand and eye co-ordination, as well as help to improve ocular motor skills, direction of movements and spatial awareness. In her experience use of FES improves sensation of the movements, enhances function, improves balance and co-coordination in standing.

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Day 1: Saturday 21st May

Time	Topic	Speaker
08.30 – 09.00	Registration Tea & Coffee	
09.00 – 09.30	Introduction	Farshideh Bondarenko
9.30 – 10.30	Why does FES enhance recovery in central nervous system conditions?	Dr. Daniel Becker
10.30 – 11.30	Promoting synaptic plasticity with non-invasive brain stimulation to enhance recovery of function in multiple sclerosis.	Prof. Diego Centonze
11.30 – 12.30	Practical	
12.30 – 13.30	Lunch	
13.30 – 15.30	Practical	
15.30 – 16.00	Break	
16.00 – 17.00	Practical	
End of day		

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Day 2: Sunday 22 May

Time	Topic	Speaker
09.00 – 10.00	Part 2	Prof. Diego Centonze
10.00 – 11.00	Part 2	Dr. Daniel Becker
11.00 – 11.20	Break	
11.20 – 12.20	An introduction to the principles and latest innovations in external and implantable FES devices for drop foot, their application and supporting clinical evidence	Dr. Salim Ghoussayni & Lynn Vale
12.20 – 13.30	Lunch	
13.30 – 14.30	Effect of FES on Sensory Motor Skills	Farshideh Bondarenko
14.30 – 15.30	Discussion, Observations & Questions	Everyone
16.00	Thank you and goodbye	

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