

# Functional Electrical Stimulation in Neurorehabilitation

Dr. Kristin Musselman

April 2 & 3, 2016

Vancouver

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## Introduction

Functional Electrical Stimulation (FES) is the use of neuromuscular electrical stimulation to enhance control of movement towards the performance of functional activities. FES provides the needed repetition of muscle activity to effect neuro-plastic changes and motor learning in clinical populations such as stroke, TBI, SCI, MS and other upper motor neuron lesions. Applications include subluxed shoulders, upper limb weakness and gait retraining.

## Course Objectives

After completing this course, you will be able to:

- 1) Understand the different stimulation parameters and how each affects the neurophysiological response.
- 2) Appropriately manipulate stimulation parameters.
- 3) Apply one- and two-channel FES efficiently & effectively.
- 4) Modify the application of FES in real time.
- 5) Identify neurological clients who are appropriate for FES.
- 6) Apply FES with confidence for common UE and LE applications.

## The Speaker

Dr. Kristin Musselman is a physical therapist and Scientist with the Neural Engineering and Therapeutics Team at the Toronto Rehabilitation Institute – Lyndhurst Centre, and an Assistant Professor in the Dept. of Physical Therapy, University of Toronto. She completed a BSc (Life Sciences) and BScPT at Queen’s University, followed by a MSc (Neurosciences) and PhD (Rehabilitation Science) at the University of Alberta. Dr. Musselman was a CIHR Post-doctoral Fellow at the Johns Hopkins School of Medicine and Kennedy Krieger Institute from 2010-2013 and an Assistant Professor in the School of Physical Therapy, University of Saskatchewan from 2013 to 2014. Her research interests include gait retraining following spinal cord injury and motor control and learning in children. She is active in the Canadian Physiotherapy Association, serving on the Executive of the Neurosciences Division and the Congress Education Committee. Dr. Musselman is also co-lead of the Walking Measures Group for the Rick Hansen Spinal Cord Injury Registry.



**Location**

Patzold Health Education Centre, Pattison Pavilion, Vancouver General Hospital 955 W 12<sup>th</sup> Ave.

**Program** See agenda on page 3 of brochure.

8:30 – 9:00 Registration and/or breakfast

9:00 – 4:00 Saturday program

9:00 – 3:30 Sunday program

Participants are encouraged to bring their own FES machines with small and large electrodes if you have them.

**Tuition**

Before February 5: \$445 + GST = \$467.25

After February 5: \$495 + GST = \$519.75

Includes 5% GST, manual, breakfasts, lunches and refreshments.

**Enrollment is limited to 20 seats.**

Cheques may be post-dated to Feb. 5 for the early bird or to March 14 for the regular rate. NSF cheques are subject to a \$25.00 administration fee. Interac transfers can be arranged.

Deadline for registration is **March 14**. Please do not make any flight arrangements until the course is confirmed with sufficient registrants.

**Cancellation Policy**

Withdrawals must be made in writing prior to March 18; an administration fee of \$40 is charged. No refunds are given after March 18 but you may send an alternate of your choosing. In the event of course cancellation, a full refund of the course fee only will be made.

**For More Information**

Contact Dianna at dmjot@telus.net or (604) 263-8730 to leave a message.

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Name: \_\_\_\_\_

Organization: \_\_\_\_\_ Prof. \_\_\_\_\_

Mailing Address: \_\_\_\_\_

Tel. Work: \_\_\_\_\_ Home: \_\_\_\_\_

e-mail: \_\_\_\_\_

Bringing FES machine? \_\_\_\_\_yes \_\_\_\_\_no Accommodation information required \_\_\_\_\_

Dietary restrictions: \_\_\_\_\_

**Before Feb. 5:** \$467.25 **After Feb. 5:** \$519.75. Price includes GST.

GST # 897046587RT0001

Make cheques payable to Dianna Mah-Jones OT Consultant; mail to 1243 W64th Ave. Vancouver V6P 2M7

**Functional Electrical Stimulation in Neurorehabilitation**

## Agenda

1. The basics of electrical stimulation 2.0 hours
  - Electrical currents
  - Neurophysiological response
  - Precautions & contraindications
  - Stimulation parameters
  - Electrode placement & applicationLecture format interspersed with small group activities
  
2. Hands-on experience #1 1.0 hour
  - Setting & manipulating parametersSmall group lab activities to reinforce content covered in session #1
  
3. Introduction to FES 1.0 hour
  - Who is appropriate?
  - Goals: Orthotic versus Therapeutic
  - FES prescription
  - Strengthening, endurance, hypertonicityLecture format interspersed with small group activities
  
4. Hands-on experience #2 0.5 hour
  - 1-channel UE case study (spasticity in triceps)Small group lab activity to reinforce content covered in session #3
  
5. UE applications & evidence 1.5 hours
  - Electrode placement
  - FES systems
  - Hemiplegic shoulder, reaching, hand movements
  - Overview of research evidenceLecture format interspersed with small group activities
  
6. Hands-on experience #3 1.0 hour
  - 1- and 2-channel applications in the UE
  - 3 case studiesSmall group lab activities to reinforce content covered in session #5
  
7. LE applications & evidence 1.5 hours
  - Electrode placement
  - FES systems
  - Weight-bearing & pre-gait activities, gait, dropped foot, sit to stand
  - Overview of research evidenceLecture format interspersed with small group activities
  
8. Hands-on experience #4 1.0 hour
  - 1- and 2-channel applications in the LE
  - 3 case studiesSmall group lab activities to reinforce content covered in session #7
  
9. FES for the trunk 0.5 hour
  - Potential applicationsLecture format with group discussion
  
10. Strategies to increase FES use in clinical practice 0.5 hour

Lecture format with group discussion
  
11. Small group clinical scenario 1.5 hours
  - Participants create FES plan for current or past patientSmall group activity with hands-on component