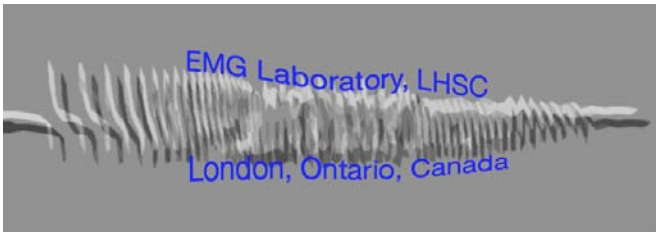
EMG RESIDENCY EDUCATIONAL PROGRAM



London Health Sciences Centre

Western

Schulich MEDICINE

OVERVIEW

This educational experience will involve either a two or three month rotation in neuromuscular clinics and in the EMG laboratory. During this period, residents will see patients with various neuromuscular consultants, and when possible will follow patients seen in the clinic into the EMG laboratory to observe and discuss the electrophysiological studies.

A variety of educational opportunities exist, including library facilities, a "bank" of key articles, end of day discussions and presentation by the residents of EMG-related topics.

Research opportunities are available and residents are encouraged to participate.

OBJECTIVES

1. Clinical neuromuscular

During the rotation,

- The resident will take histories and perform neurological examinations on patients referred to the neuromuscular clinic or EMG laboratory, or on consults from the inpatient service.
- The resident will gain a thorough understanding of peripheral nerve and muscle anatomy, including the root, plexus and peripheral nerve innervation needed to localize common disorders of the peripheral nervous system.
- Based on the clinical assessment, the resident will localize the problem and formulate a differential diagnosis.
- The resident will plan appropriate investigations, including the formulation of an electrodiagnostic approach to the patient's problem.
- When a specific diagnosis can be reached, the resident will formulate a management plan.

On an ongoing basis, the attending neuromuscular consultant will review the resident's clinical skills, with appropriate feedback given. Based on this feedback, residents are expected to refine their clinical skills in the diagnosis and management of common neuromuscular conditions.

At the end of the rotation, all residents will:

- Have knowledge of the necessary neuroanatomy in order to be able to perform and interpret a clinically relevant examination of the peripheral nervous system.
- Be able to clinically diagnose and manage common neuromuscular conditions.

2. Clinical electromyography

During the rotation:

- The resident will, based on their clinical assessment, construct an electrodiagnostic approach that is

specific to the clinical presentation.

- The resident will be able to request the appropriate electrodiagnostic studies by filling in a detailed EMG requisition.
- The resident will observe the electrodiagnostic studies performed on patients they have seen in the neuromuscular clinic.
- The resident will learn the basic principles and techniques of nerve conduction studies and needle electromyography through observation of studies being performed by the technologists and by the consultant electromyographer.
- The resident will familiarize themselves with the basic principles and techniques of other specialized studies such as repetitive nerve stimulation, single fibre electromyography, blink responses and somatosensory evoked potentials
- The resident will read key articles on basic neurophysiology and electrophysiology.
- Later in the rotation, residents with an interest in neuromuscular neurology and/or clinical neurophysiology will perform basic electrodiagnostic studies.

On an ongoing basis, the resident's understanding of electrodiagnostic principles and techniques, and ability to request appropriate studies, will be reviewed by the technologists and consultant electromyographer, with appropriate feedback.

At the end of the rotation, all residents will:

- Be able to explain the physiology of normal and abnormal nerve conduction in unmyelinated and myelinated fibres, neuromuscular transmission and excitation-contraction coupling.
- Order appropriate electrodiagnostic tests for common neuromuscular diseases.
- Be familiar with the general principles of standard motor and sensory nerve conduction studies, and of needle electromyography.
- Correctly interpret results of standard electrophysiological studies, and recognize the characteristic electrophysiological findings observed in myelopathies, motor neuron diseases, radiculopathies, plexopathies, focal and generalized neuropathies, disorders of neuromuscular transmission and myopathies.
- Correlate the results of electrodiagnostic studies with the clinical presentation.
- Recognize when results do not fit and may represent technical errors, normal variations or incidental findings.
- Be familiar with the general principles of some specialized techniques including repetitive nerve stimulation, single fibre electromyography, blink responses and somatosensory evoked potentials, and be able to interpret the results of these studies.

At the end of the rotation, those residents with an identified interest in a career in neuromuscular diseases and/or clinical neurophysiology (EMG) will:

- Be able to independently perform basic nerve conduction studies on the median, ulnar and peroneal nerves to a level of expertise which will allow them to pursue further training in clinical electromyography.
- Succinctly and correctly interpret and report electrodiagnostic results.

3. Educational

During the rotation, residents will:

- Attend daily sessions to review selected studies done that day in the EMG laboratory (please arrange with supervising EMG physician, usually at the end of the day 430-500pm)
- Participate in any scheduled EMG lab educational sessions, including giving short presentations on clinical electromyography topics, to be chosen after discussion with the consultant electromyographer.
- Participate in monthly EMG academic review sessions (2-3 cases chosen by consultants are reviewed to discuss technical problems, interpretation, design of studies etc). Currently 3rd Monday of each month; Sept through June. See Brad Watson for schedule.
- Participate in all, and present at some, neuromuscular rounds (monthly)

Feedback on the resident's understanding and presentation of these topics will be given informally by

the consultant electromyographers.

At the end of the rotation, all residents will:

- Have detailed knowledge of select clinical neuromuscular diseases.
- Have detailed knowledge of clinical electromyography for specific topics.

4. Research

During the rotation, residents will:

- Be given the opportunity to be involved in new or ongoing research in the EMG laboratory. This may involve hypothesis generation, collection and analysis of data, preparation of an abstract for presentation and a manuscript for publication.

At, or after, the conclusion of the EMG rotation, those residents showing an interest in research

- Will submit this work for presentation (e.g. at annual residents research day, or appropriate national and international scientific meetings) and, when possible, publish this work.

PROGRAM STRUCTURE

In this 2-3 month rotation, the following elements will be included:

1. Clinical neuromuscular (≈ 5 clinics/week) - Dr's Doherty, Hahn, Nicolle, Shoesmith, Strong and Venance

Neuromuscular clinics (NM) included in this rotation include Dr's Hahn (Monday - General neuromuscular, genetic neuromuscular diseases, inflammatory neuropathies), Strong (Tuesday - General neuromuscular, motor neuron diseases, needle muscle biopsies), Nicolle (Wednesday - General neuromuscular, neuromuscular transmission), Venance (Thursday – General neuromuscular, muscle disease) and Shoesmith (Friday - General neuromuscular, motor neuron diseases). Dr. Doherty also has clinics (contact him for details) where patients with neuromuscular disorders are seen for physiatry consultations.

The usual plan is to see new consults in the NM Clinic and follow them in to the EMG lab to observe or participate in studies (at least one in the morning and another in the afternoon). The current exception to this is Tuesdays, when residents are expected to spend the entire day in Dr. Strong's clinic. The balance between clinic and EMG lab is flexible, after discussion with the rotation supervisor (Dr. Nicolle) and the consultant in the NM clinic.

Towards the end of the day when things are quiet in the EMG lab residents are expected to return to the NM clinic to see remaining consults and/or follow up patients. A wealth of clinical neuromuscular disease is seen in follow-up and residents will whenever time allows, avail themselves of the opportunity to see these patients.

If clinics are not scheduled because of consultant absence (vacation, conference etc) residents are expected to spend the day in the EMG lab seeing consults and participating in studies.

Interested residents are also encouraged to contact Dr. Doherty to arrange attendance in his clinic if they wish more experience in neuromuscular rehab and musculoskeletal medicine.

Residents will see new consults and in most cases, after discussion of the clinical aspects with the attending neuromuscular consultant, will follow the patient into the EMG laboratory to observe the studies.

2. Clinical electromyography (EMG lab) – Dr's Nicolle, Doherty, Venance, Strong and Shoesmith

The EMG lab is covered by Drs. Nicolle (Mondays and Tuesdays), Strong and Shoesmith (Wednesdays), Doherty (Thursdays) and Venance (Fridays).

Residents will observe studies done on patients seen in the clinic, and whenever possible, on other patients in the EMG laboratory.

Later in the rotation, those residents with an interest in neuromuscular diseases and/or clinical neurophysiology may perform some of the basic electrodiagnostic studies and dictate a report of these studies.

Depending on the resident's interest, some days may be spent entirely in the EMG lab (as opposed to the various neuromuscular clinics) – please discuss with supervisor (Dr. Nicolle) and ensure that appropriate consultant is aware you will not be attending clinic for that particular day.

Consults are also seen in the EMG lab (generally focal neuropathies) and residents are expected to see these and then observe/perform studies done.

3. Educational (EMG lab)

Residents may be asked to present one or two brief talks at EMG laboratory rounds (ad hoc schedule, please see Mr. Brad Watson).

Residents will participate in neuromuscular rounds and other teaching sessions.

In order to attain the objectives listed above, a library of educational material (textbooks and key articles) is available in the EMG laboratory for self-directed learning. See below for specific suggested textbooks.

4. Other/optional

Depending on time and interest, trainees may also have opportunities to gain experience in other aspects of neuromuscular disease, including:

- Needle muscle biopsies (Dr's Nicolle, Strong, Shoesmith or Venance – all arranged ad hoc)

5. Evaluation - Dr. Nicolle

After completion of the rotation, all residents will be evaluated, based on a synthesis of written comments from consultants and EMG laboratory staff. Trainees will also be expected to evaluate the EMG rotation, and the individual consultants.

READING LIST

One or more of the following textbooks are suggested as resources during the rotation (copies of some of these are available for use in the EMG laboratory – see Brad Watson).

- Electromyography and Neuromuscular Disorders: Clinical-Electrophysiologic Correlations (Preston and Shapiro) – clinical and EMG
- Electrodiagnosis in Diseases of Nerve and Muscle: Principles and Practice (Kimura) – clinical and EMG
- Electrodiagnostic Medicine (Dimitru) – clinical and EMG
- Anatomical Guide for the Electromyographer: The Limbs and Trunk (Perotto) – useful reference found in lab
- Manual of Nerve Conduction Studies (Buschbacher) – for those who will end up doing EMG
- Neuromuscular Disease: Evidence and Analysis in Clinical Neurology (Benatar) - clinical

NOTES

No specific call for this rotation is required (although residents may be asked to participate in the clinical teaching unit call schedule, depending on circumstances).

M. Nicolle MD Feb 2009