Who is Qualified to Practice Electrodiagnostic Medicine?

Introduction

To respond to inquiries received in the American Association of Electrodiagnostic Medicine's (AAEM) Executive Office from physicians and nonphysicians who are working with their local institution's credentialing committees, practice boards, or other interested parties, the AAEM has developed the following statement of its recommendations regarding who is qualified to practice electrodiagnostic medicine.

Executive Summary

Electrodiagnostic medicine (EDX) consultations must be performed by physicians who have comprehensive knowledge of neurological and musculoskeletal disorders to assure accurate interpretation and diagnosis. The typical EDX consultation involves: (1) a focused neuromusculoskeletal history and physical examination; (2) the development of a differential diagnosis; (3) the examination of muscles and nerves utilizing nerve conduction studies (NCSs) and needle electromyography (EMG); and (4) the determination of a final diagnosis. The standard of care in clinical practice dictates that each of these components cannot be predetermined or standardized.

The physical examination is directed by the individual patient's particular symptoms and clinical history. Based on the history and physical examination, the differential diagnosis is determined by the physician, and the nerves and muscles to be studied are selected. The results of the pertinent initial NCSs are reviewed by the physician to ascertain whether additional NCSs are needed. It may also become apparent during the performance of the NCSs that specialized nerve evaluation, such as repetitive stimulation studies, is indicated. Following the performance of NCSs, the needle EMG examination is formulated based on the data obtained during the prior portion of the consultation. For this reason, it is in the best interest of the patient that NCSs be performed under the direct supervision of an EDX consultant.

It is the position of the AAEM and other organizations that the needle EMG examination must be performed by a physician with special training in electrodiagnostic medicine (generally neurologists or physiatrists). Performance of needle EMG requires ongoing assessment by the EDX consultant during the study of each muscle, to ascertain what type of abnormalities exist (if any), their significance, and, based on the results, which other muscles, if any, must be examined. The physician's decision to perform additional or special electromyographic studies is directly guided by the individual results obtained as the physician seeks to establish evidence of a particular medical diagnosis through the studies performed.

Much of the data used to make a final diagnosis are obtained through observations made during the performance of the needle EMG examination. It is in the best interest of patients undergoing these evaluations for public policy to define needle EMG as the practice of medicine.

Recommended Qualifications to Practice Electrodiagnostic Medicine

The EDX consultation is an assessment of a patient by a physician to establish an accurate diagnosis of a presenting clinical problem that suggests a neuromuscular disorder. The physician establishes the diagnosis after performing a focused history, review of the symptoms and physical examination, and electrophysiologic evaluation of selected functions of the central nervous system, nerve roots, peripheral nerves, neuromuscular junction, and muscles. When an accurate diagnosis has been made, the referring physician is able to develop the best treatment plan possible.

It is therefore the AAEM's position that the EDX consultant should be a physician who has had special training in the diagnosis and treatment of neurological and neuromuscular diseases and in the application of particular neurophysiologic techniques to the study of these disorders. This type of training is generally included in the residency or fellowship programs of physicians who specialize in physical medicine and rehabilitation (physiatrists) or neurology (neurologists). The knowledge and expertise gained from such specialized medical training maximizes the ability of the consultant to consider appropriate differential medical diagnoses dependent upon the initial definition of the particular patient's clinical problem. This training also allows the consultant to use preliminary data collected from the patient's history and physical examination in planning the course of the EDX examination. Additionally, this knowledge and expertise enables the consultant to assist colleagues in particularly complex diagnostic situations.

The EDX consultation is actually an extension of the neurologic portion of the physical examination and requires detailed knowledge of the patient and his or her disease. Unlike many laboratory tests, EDX testing is not performed in a standard fashion, but must be specifically designed for each individual patient. In addition, it is often necessary to modify or add to the procedure during the examination, depending on the findings as they unfold. Only in this way can appropriate data be collected and the proper conclusions be drawn.

Collection of the clinical and electrophysiologic data should be entirely under the supervision of the EDX consultant. The consultant may collect all of the data directly from the patient or may delegate collection of some data to a specifically trained nonphysician or physician in a residency training program or fellowship. Data collection is achieved by a variety of procedures, including motor and sensory nerve conduction latency and velocity studies, invasive needle or surface electrode EMG, repetitive stimulation studies, reflex latency measurements, measurements utilizing electronic averaging of evoked potentials, twitch tension measurements, exercise tests, and evaluation of autonomic nervous system functions.

Many of these tests are also carried out for the purpose of monitoring nerve and muscle function during surgical procedures. The term EMG has often been used to mean the entire spectrum of electrodiagnosis of nerve and muscle diseases. Strictly speaking, however, EMG refers only to the needle or surface electrode examination of the bioelectric activity of muscles. Determination of appropriate delegation should be at the

discretion of the EDX consultant, but only physicians should perform any portion of the examination which requires needle insertion (needle electromyography - EMG). This AAEM position regarding needle EMG is similar to that of the American Medical Association,1 American Academy of Neurology,2 American Academy of Physical Medicine and Rehabilitation,3 American Neurological Association, Department of Veterans Affairs (Veterans Administration),4 and many state medical examining boards. There has also been a court decision upholding this principle.5

Needle electrode insertion requires a detailed knowledge of anatomy and carries a small but finite risk of injury to anatomic structures (nerves, arteries) that can only be reliably identified by a physician. Appropriate precautions must also be taken to avoid transmitting possible lethal diseases, such as hepatitis, Jakob-Creutzfeldt disease, or acquired immune deficiency syndrome. Furthermore, some patients have additional risk factors that require testing by a physician knowledgeable in the recognition and management of those problems. Such patients include those who require examination near major blood vessels or the abdomen or lung, are on anticoagulants, have undergone recent cardiac surgery for valve replacement, or have pacemakers, bleeding disorders, or in-dwelling central venous or arterial lines.

Interpretation of electrophysiologic data and integration with other clinical data in making a diagnosis are carried out by the EDX consultant based on his or her training, knowledge, and experience. Improper performance or interpretation of the EDX examination may be dangerous to the patient and misleading to the referring physician. For example, the exact site and type of a surgical operation performed on a patient may be determined in part by findings of disease discovered during the course of the EDX examination. The physician’s knowledge of diseases and their clinical electrophysiologic manifestations is therefore needed to interpret such results properly.

Training should include the basic sciences pertinent to the understanding of these diseases, as well as additional special knowledge of electrophysiologic techniques. The recommended educational requirements for the EDX consultant are as follows:

1. A residency in neurology or physical medicine and rehabilitation, accredited by the Accreditation Council for Graduate Medical Education or Royal College of Physicians and Surgeons of Canada, should be satisfactorily completed.
2. A period of preceptorship in electrodiagnostic medicine that is coordinated with presentation of didactic material should be satisfactorily completed under direct supervision of an experienced EDX consultant. This period of preceptorship should be at least 6 months full-time or equivalent. The first 3 months should be rigidly structured and supervised. During the entire training period, at least 200 complete EDX evaluations should be performed on separate occasions; these studies should be documented and interpreted and include exposure to neuromuscular disorders in adults and children, such as neuropathies, myopathies, radiculopathies, neuromuscular junction disorders, spinal cord, and brain disorders. It is recommended that the laboratory be in an institution that has an approved residency training program in neurology and/or physical medicine and

rehabilitation. The preceptorship may be taken during or after an approved graduate medical education program. The EDX training should include adequate educational experience in:

a. anatomy.
b. pathology of muscle and nerve,
c. neuromuscular physiology,
d. electrophysiology - including instrumentation, quantification, and statistical analysis, and
e. clinical aspects of neurological and musculoskeletal conditions with particular emphasis on diagnosis and treatment of neuromuscular diseases as they pertain to clinical electrodiagnostic medicine.

Since a variety of clinical experiences is needed in order to become a competent EDX consultant, institutions may vary in their ability to provide training in all areas. Arrangements with other institutions providing the appropriate training may be necessary, although the primary training institution (laboratory) and the chief EDX consultant should assume overall responsibility for adequate training. An AAEM document, Educational Guidelines for Electrodiagnostic Training Programs, is available to assist directors in reviewing their programs and is included in Chapter 1 of these guidelines.

3. Full competency in electrodiagnostic medicine can only be achieved with at least 1 more year of experience following training, during which the physician must perform an additional 200 complete EDX evaluations on separate occasions. This period of independent experience must begin after completion of both the approved graduate medical education program and the preceptorship. The year of independent experience may be part of a postresidency program when the candidate is given primary responsibility for the EDX evaluation, interpretation of the results, and preparation of the reports.

An annual examination is given by the American Board of Electrodiagnostic Medicine (ABEM) through which candidates are able to assess their level of competence. The ABEM is an independent credentialing body established by the AAEM. Certification in electrodiagnostic medicine by an examining board, such as the ABEM, is also recommended.
Institutions should define their own criteria for granting clinical privileges; these criteria may include completion of a residency program, specialized course work, or specialty subcertification. Current policies of the American Medical Association and the Joint Commission on Accreditation of Healthcare Organizations state that delineation of clinical privileges be determined based on the individual’s competence.

To determine what official legal, governmental, or private criteria govern the practice of electrodiagnostic medicine in specific circumstances, individuals should contact their

own state’s Attorney General, practice board(s), or other appropriate authorities. Individuals may obtain information about the association’s position from the AAEM Executive Office to forward to credentialing bodies, insurance carriers, or other interested parties or may refer them directly to the AAEM.

Additional information about electrodiagnostic medicine can be found throughout the AAEM's *Guidelines in Electrodiagnostic Medicine*. In addition, the following brochures can be obtained through the AAEM Executive Office: *What Is Electrodiagnostic Medicine? An Information Brochure for Patients Undergoing Electrodiagnostic Medicine Testing* and *Electrodiagnostic Medicine Consultation: AAEM Resource Guide for Referring Physicians.*

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References

1. American Medical Association. House of Delegates, Resolution: 62, I-83; Reaffirmed CLRPD Rep. I-93-1.
2. American Academy of Neurology. Minutes of Executive Board Meeting 11.9 (1) December 2, 1981.
3. American Academy of Physical Medicine and Rehabilitation. Statement re: Clinical Diagnostic Electromyography, November 1983.
4. Veterans’ Administration. Professional Services Letter: Professional Qualifications for Performing Electromyographic Examinations IL-11- 80-1, January 4, 1980.
5. Caniglia v. New Jersey State Board of Medical Examiners No. A-3435- 74 (Superior Court of New Jersey, Appellate Division - June 17, 1976, Unpublished Opinion).