AANEM
Position Statement
American Association of Neuromuscular & Electrodiagnostic Medicine

Neuromuscular Ultrasound Qualifications

Francis O. Walker, MD, Katharine E. Alter, MD, Andrea J. Boon, MD, Michael S. Cartwright, MD, Victor H. Flores, MD, Lisa D. Hobson-Webb, MD, Christopher H. Hunt, MD, Scott J. Primack, DO, Steven J. Shook, MD

Introduction and Definitions

Neuromuscular ultrasound is an emerging diagnostic subspecialty field. Neuromuscular ultrasound focuses on primary diseases of nerve and muscle. It is distinct from musculoskeletal ultrasound, which focuses on traumatic and degenerative changes of tendons and synovial joints. High resolution ultrasound allows physicians to study peripheral nerves to evaluate neuromuscular diseases. In the past, electrodiagnostic testing was used to diagnose these diseases; however neuromuscular ultrasound can now complement the electrodiagnostic findings. It is the position of the AANEM that neuromuscular ultrasound is within the scope of practice of specialists in neurology and physical medicine and rehabilitation who havedemonstrated the prerequisites for the performance and interpretation outlined below. It is the position of AANEM that the interpretation of neuromuscular ultrasound is the practice of medicine.

Evolution of Neuromuscular Ultrasound

The first report of the utility of neuromuscular ultrasound was 30 years ago with the elucidation of distinct imaging characteristics of muscular dystrophy. High resolution/high frequency ultrasound transducers have since made it possible to routinely study peripheral nerves. It is now clear that anatomic changes are frequently associated with inflammatory and compressive neuropathies and that these changes are of diagnostic significance. The ability to sensitively evaluate muscle disease has also improved to the point that now it is possible to image fasciculations of muscle and, most recently, fibrillations. Atrophy and hypertrophy are readily measured as are changes in quantitative muscle echointensity. Reference standards for neuromuscular ultrasound have been published.

Interventional applications of neuromuscular ultrasound have quickly advanced. Neuromuscular ultrasound is now routinely used to guide local anesthetic administration for proximal nerve and brachial plexus blocks. Ultrasound decreases the risk of inadvertent intraneural or intravascular injection and enhances nerve localization which lowers drug doses needed and improves safety margins. The technique has also been used to guide therapeutic injections of botulinum toxin in muscle and salivary glands, steroids into the carpal tunnel, and biopsies of nerve and muscle. Ultrasound guided EMG needle placement can also be used to more safely study high risk muscles such as the diaphragm, or to assist with direct needle stimulation of deep nerves at sites inaccessible to percutaneous stimulation.

Clinical Indications for Neuromuscular Ultrasound

Studies to date have suggested that neuromuscular ultrasound may be useful in diagnosing focal neuropathies including: carpal tunnel syndrome, ulnar neuropathy at the elbow, and peroneal (fibular) neuropathy at the fibular head, hereditary neuropathies, nerve transection, as well as the detection of nerve tumors and neuromas. Additional evidence suggests a role for ultrasound in the diagnosis of multifocal motor neuropathy and other inflammatory neuropathies, and in the evaluation of a variety of primary muscle diseases including muscular dystrophy, inflammatory myopathies, and neurogenic muscle atrophy.

Ultrasound technology is rapidly evolving and the variety of neuromuscular diseases is expanding. The use of neuromuscular ultrasound, a painless, noninvasive and cost-effective technique, is likely to increase in the future. Since 1953, the AANEM has overseen the development, growth, and clinical applications of clinical neurophysiology in neuromuscular diseases and is well suited to take a lead role in the development, growth, and clinical applications of neuromuscular ultrasound.

Prerequisites for the Performance and Interpretation of Neuromuscular Ultrasound

Proficiency in the neuromuscular ultrasound requires:

1. An understanding of peripheral nerve and muscle anatomy, including normal variants which can mimic diseases.
2. An understanding of the distribution patterns of myopathic and neurological diseases.
3. An understanding of the risks and benefits of surgical and medical treatment of nerve and muscle disease.
4. The ability to correlate ultrasound imaging with clinical findings, including genetic, serological,

histopathologic, radiographic, and electrodiagnostic tests.
5. The ability to understand and recommend appropriate correlative studies.
6. The ability to modify the examination based on real-time findings.
7. An understanding of ultrasound equipment and basic principles upon which ultrasound operates.
8. An understanding of ultrasound technique and common artifacts.
9. An understanding of imaging characteristics of abnormal and healthy muscles and nerves.

These prerequisites are distinct from those needed for musculoskeletal ultrasound. Because items 1-6 are required for proficiency in electrodiagnostic medicine, many physiatrists and neurologists already possess these skills. Physicians certified by the American Board of Electrodiagnostic Medicine (ABEM) physicians have already demonstrated competence in these six items. Since patients with neuromuscular disorders are routinely referred for electrodiagnostic testing, the EMG laboratory is an ideal setting for physicians to acquire, refine and apply skills in neuromuscular ultrasound.

Professional Development

The AANEM is prepared to provide continuing medical education to physicians who wish to acquire prerequisite skills in the clinical, laboratory, and electrodiagnostic evaluation of patients with neuromuscular disease. The AANEM is also willing to partner with other interested medical organizations to improve education and research in the emerging field of neuromuscular ultrasound.

Approved October 28, 2009 by the AANEM Board of Directors.

Updated and Reapproved December 2014 by the AANEM Board of Directors.