

Lower Extremity Focused Neurologic Examination



James P. Wilton, DPM

KEYWORDS

• Nerve • Sensory • Motor • Injury • Dysesthesia • Pain

KEY POINTS

- A focused lower extremity neurologic examination is based on motor examination, sensory examination and deep tendon reflexes. The physician should review all prior examinations and test results for a complete medical evaluation.
- It is common in clinical practice to encounter patients presenting with chronic limb pain.
- A thorough and complete lower extremity neurologic examination will aid in the development of a differential diagnosis of neuropathic pain and limb dysfunction.
- The end result will aid in the differential diagnosis of neuropathic pain and limb dysfunction.
- The practitioner should be able to differentiate between lower extremity peripheral nerve injury, peripheral neuropathy, lumbosacral nerve pathology, upper motor neuron disease, and central nervous system pathology.

Medical training today has become so compartmentalized between the medical specialties that a patient presenting with limb pain or dysfunction may have several different diagnostic labels attributed to the etiology of their problem. When a practitioner who primarily works with the structural limb components associated with long bones, muscles, tendons, ligaments, and joints evaluates a patient with limb pain, he approaches the patient with different diagnostic eyes than the practitioner who primarily works with the medical causes of pain. A podiatric foot and ankle surgeon, orthopedic foot and ankle surgeon, general orthopedist, vascular surgeon, plastic surgeon, physiatrist, pain specialist, family practitioner, pediatrician, internist, and neurologist all bring different skill sets to the diagnostic process of peripheral limb pain. Although the first 2 years of medical training for all of these medical practitioners are essentially indistinguishable from a basic science standpoint and physical examination skill set standpoint, the following 2 years of medical school and subsequent residency and fellowship training are so highly compartmentalized and specialized

Department of Orthopedics, New England Peripheral Nerve Center, Valley Regional Hospital, 241 Elm Street, Claremont, NH 03743, USA

E-mail address: James.Wilton@VRH.org

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that commonalities in diagnostic approaches are very varied. Midlevel providers such as physician assistants and nurse practitioners also have very diverse clinical training and bring different education and experience to the arena of clinical examination.

The Association of Extremity Nerve Surgeons devotes this article to the “hands-on” peripheral neurologic examination developed for the students in the basic and advanced peripheral nerve surgery courses. It is not the purview of this paper to delve into the lower extremity orthopedic, dermatologic or vascular examination because the assumption will be made that most practitioners reading this monograph have adequate skill sets in these components of the clinical assessment. The greatest weakness that we faculty have observed in the board-certified surgeons who participate in these specialized peripheral nerve surgical training courses is not the individual surgical skills needed to perform peripheral nerve surgery, but the lack of a competent and complete initial diagnostic “hands-on” neurologic workup of patient’s experiencing chronic pain (Robert Parker, DPM FAENS FACFAS, Houston, Texas, personal communication, May 2015).

These gifted lower extremity surgeons who can technically perform complex reconstructive foot and ankle surgery have, to some degree, lost some of the basic skills that they learned as first and second year medical students in the clinical examination of a patient. Through the development of highly specialized skill sets in their residency and fellowship training, they have relegated many components of the basic peripheral neurologic examination to antiquity. Nonsurgical specialists that take these training courses also benefit from learning these clinical neurologic examinations because they will refine and develop new skill sets to help them diagnosis complex patients experiencing chronic limb pain that present to their practices.

The clinical examination must focus on past medical, past surgical, and past traumatic history in addition to the hands-on testing of the peripheral nervous system. In most cases, patients who present to podiatric foot and ankle surgeons for evaluation and treatment of chronic limb pain have been worked up thoroughly through multiple layers of medical care. It is not uncommon to initially evaluate the patient with chronic limb pain who has seen their family practitioner, orthopedic surgeon, physiatrist, neurologist, and pain physician. Medical records including family and social history, past medical and surgical histories, diagnostic imaging studies, hematologic studies, and electrodiagnostic studies are usually readily available for review. It is very helpful to take the approach to allow your hands-on clinical neurologic examination to be the foundation of your diagnostic decision making process.¹ Although previous diagnostic testing and studies can be helpful, they are only a piece of the diagnostic pie. If the clinical approach is cursory in nature and major components of the neurologic examination are not performed, then conclusions and the final diagnosis may be based on false or inaccurate data.² It is the ultimate goal of a competent and complete lower extremity neurologic evaluation to develop a working diagnosis and to also see if referral to medical practitioners in other fields, diagnostic imaging or additional electrodiagnostic testing is needed.

Unfortunately, the 14th-century principal of *Lex Parsimoniae* or Occam’s Razor comes in play far too many times by medical specialists in developing the diagnosis and etiology for chronic peripheral nerve pain. This medieval principal states that, when multiple hypotheses are given for a problem, the simplest solution should be selected. This myopic view concerning complex problems invariably leads to an incorrect diagnosis (William Ericson FAAOS, MD, Seattle, Washington, personal communication, July 2013).

Complex clinical presentations of chronic limb pain invariably are not of a simple etiologic origin but derive out of complicated scenarios. It is only through a complete

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