

Electrodiagnosis of cervical radiculopathy

Compression may occur at the level of the dorsal (pre-ganglionic) sensory root (which, if occurs alone, produces a sensory-only radiculopathy) and/or at the ventral (motor) root. When motor exam is normal, EMG is unlikely to show abnormality. The American Association of Electrodiagnostic Medicine practice parameter for cervical radiculopathy ^{1) 2) 3)} reports sensitivity of 50-71 % for the needle EMG examination and correlation between positive needle EMG and radiologic findings 65-85 %.

EMG can also be normal in sensory only radiculopathy, which occasionally occurs in [cervical spine](#), but not in lumbar spine. Since most muscles have at least dual innervation this poses a particular challenge for proximal cervical radiculopathies in which many muscles have the same shared innervation, e.g. biceps, deltoid, brachioradialis, infraspinatus and supraspinatus are all innervated by C5-C6.

The [electrodiagnostic examination](#) with needle [electromyography](#) is the most important means of testing for [radiculopathy](#). This test has modest sensitivity but high specificity. It complements imaging of the spine. Electromyography in combination with nerve conduction testing is valuable in excluding entrapment neuropathies and [polyneuropathy](#), conditions that frequently mimic radicular symptoms. A streamlined examination with 6 muscles, 1 of which is the paraspinal, has a high diagnostic yield, yet minimizes patient discomfort and examiner time ⁴⁾.

For muscles to demonstrate [fibrillation](#) and positive waves there must be axonal loss in the motor nerve axons which innervates a muscle. Muscle demonstrates fbs and positive waves within 1 to 2 weeks following loss of innervation depending on the distance from the nerve to the muscle.

NCV is helpful to assess for [peripheral neuropathy](#) which may have symptoms similar to [radiculopathy](#) (e.g. [carpal tunnel syndrome](#) vs. [C6 radiculopathy](#); ulnar neuropathy vs. [C8 radiculopathy](#)).

A good physical exam can differentiate these entities in most cases.

Electrodiagnostic testing is not needed if the diagnosis is clear, but has clinical utility when peripheral neuropathy of the upper extremity is a likely alternate diagnosis.

Guideline

Needle [EMG](#) examination of at least 1 [muscle](#) innervated by the [C5](#), [C6](#), [C7](#), [C8](#), and [T1](#) spinal roots in a symptomatic limb, performed and interpreted by a specially trained physician. Cervical [paraspinal muscles](#) at 1 or more levels, as appropriate to the clinical presentation, should be examined (except in patients with prior [cervical laminectomy](#) using a posterior approach). If a specific root is suspected clinically, or if an abnormality is seen on the initial needle EMG examination, additional studies as follows:

a. Examination of 1 or 2 additional muscles innervated by the suspected root and a different peripheral nerve. b. Demonstration of normal muscles above and below the involved root.

2. Guideline: At least 1 motor and 1 sensory NCS should be performed in the clinically involved limb to determine if concomitant [polyneuropathy](#) or [nerve entrapment](#) exists. Motor and sensory NCSs of the [median nerve](#) and [ulnar nerves](#) should be performed if symptoms and signs suggest CTS or ulnar

neuropathy.

If 1 or more NCSs are abnormal, or if clinical features suggesting polyneuropathy are present, further evaluation may include NCSs of other nerves in the ipsilateral and contralateral limbs to define the cause of the abnormalities.

3. Option: If needle EMG examination is abnormal, needle EMG of 1 or more contralateral muscles may be necessary to exclude bilateral radiculopathy, or to differentiate between radiculopathy and polyneuropathy, motor neuron disease, spinal cord lesions, or other neuromuscular disorders.

4. Option: Perform median and/or ulnar F-wave studies in suspected C8 or T1 radiculopathy. Compare with the contralateral side if necessary.

5. Option: Perform cervical nerve root stimulation to help in identifying radiculopathy. 6. Option: Perform H-reflex study of the flexor carpi radialis to assist in identifying pathology of the C6 and C7 nerve roots.

1)

Jablecki CK, Andary MT, Floeter MK, Miller RG, Quartly CA, Vennix MJ, Wilson JR; American Association of Electrodiagnostic Medicine; American Academy of Neurology; American Academy of Physical Medicine and Rehabilitation. Practice parameter: Electrodiagnostic studies in carpal tunnel syndrome. Report of the American Association of Electrodiagnostic Medicine, American Academy of Neurology, and the American Academy of Physical Medicine and Rehabilitation. *Neurology*. 2002 Jun 11;58(11):1589-92. PubMed PMID: 12058083.

2)

American Association of Electrodiagnostic Medicine, Campbell WW. Guidelines in electrodiagnostic medicine. Practice parameter for electrodiagnostic studies in ulnar neuropathy at the elbow. *Muscle Nerve Suppl*. 1999;8:S171-205. PubMed PMID: 16921634.

3)

American Association of Electrodiagnostic Medicine. Chapter 9. Practice parameter Muscle Nerve 22: Supplement8: S209-S211, 1999

4)

Dillingham TR. Evaluating the patient with suspected radiculopathy. *PM R*. 2013 May;5(5 Suppl):S41-9. doi: 10.1016/j.pmrj.2013.03.015. Epub 2013 Mar 19. Review. PubMed PMID: 23524070.

From:
<https://neurosurgerywiki.com/wiki/> - **Neurosurgery Wiki**

Permanent link:
https://neurosurgerywiki.com/wiki/doku.php?id=electrodiagnosis_of_cervical_radiculopathy

Last update: **2024/06/07 03:00**

