

Clinical Policy Bulletin:

Nerve Conduction Velocity Studies

Policy : Insurance Companies considers nerve conduction velocity (NCV) studies medically necessary when *both* of the following criteria are met:

Member has *any* of the following indications: Diagnosis and prognosis of traumatic nerve lesions (e.g., spinal cord injury, trauma to nerves); *or*

- A. Diagnosis and monitoring of neuromuscular junction disorders (e.g., myasthenia gravis, myasthenic syndrome) using repetitive nerve stimulation; *or*
- B. Diagnosis of muscle disorders (e.g., myositis, myopathy); *or*
- C. Diagnosis or confirmation of suspected generalized neuropathies (e.g., uremic, metabolic or immune); *or*
- D. Differential diagnosis of symptom-based complaints (e.g., pain in limb or joint, weakness, fatigue, cramps, twitching (fasciculations), disturbance in skin sensation or paresthesias [numbness or tingling]) provided the clinical assessment supports the need for a study; *or*
- E. Localization of focal neuropathies or compressive lesions (e.g., carpal tunnel syndrome [see selection criteria below], tarsal tunnel syndrome, nerve root compression, neuritis, motor neuropathy, mononeuropathy, radiculopathy, plexopathy); **AND**

For indications other than carpal tunnel syndrome, myasthenia gravis and Lambert-Eaton myasthenic syndrome, member has had a needle electromyographic (EMG) study to evaluate the condition either concurrently or within the past year. The requirement for needle EMG with NCV may be waived for persons on anticoagulant therapy with warfarin (Coumadin), direct thrombin inhibitors (e.g., dabigatran (Pradaxa), desirudin (Iprivask)), or heparins that cannot be interrupted.

Insurance Companies considers nerve conduction velocity studies experimental and investigational when these criteria are not met. Carpal Tunnel Syndrome Selection Criteria:

For evaluation of individuals suspected of having carpal tunnel syndrome, Insurance Companies considers the following services to be medically necessary:

Sensory conduction studies across the wrist of the median nerve, and if the results are abnormal, of one other sensory nerve in the symptomatic limb; *and*

If the initial median sensory nerve conduction study across the wrist has a conduction distance greater than 8 cm, and the results are normal, additional studies as listed below:

- A. Comparison of median sensory conduction across the wrist with radial or ulnar sensory conduction across the wrist in the same limb; *or*
 - B. Median sensory conduction across the wrist over a short (7 to 8 cm) conduction distance.
- Motor conduction studies of the median nerve recording from the thenar muscle and of one other nerve in the symptomatic limb to include measurement of distal latency.

Frequency of Testing:

The following table lists the American Association of Neuromuscular & Electrodiagnostic Medicine's (formerly known as American Association of Electrodiagnostic Medicine) recommendations concerning a reasonable maximum number of NCV, needle EMG and other EMG studies per diagnostic category needed for a physician to render a diagnosis:

| Indications | Needle EMG | Nerve Conduction Studies | | Other EMG Studies | |
|---|------------|--|---------------------|-------------------|---|
| | | Motor NCV studies with and/or without F-wave | Sensory NCV studies | H-Reflex | Neuromuscular Junction Testing (Repetitive Stimulation) |
| Carpal tunnel (unilateral) | 1 | 3 | 4 | -- | -- |
| Carpal tunnel (bilateral) | 2 | 4 | 6 | -- | -- |
| Radiculopathy | 2 | 3 | 2 | 2 | -- |
| Mononeuropathy | 1 | 3 | 3 | 2 | -- |
| Polyneuropathy/Mononeuropathy Multiplex | 3 | 4 | 4 | 2 | -- |
| Myopathy | 2 | 2 | 2 | -- | 2 |
| Motor Neuropathy | 4 | 4 | 2 | -- | 2 |
| Plexopathy | 2 | 4 | 6 | 2 | -- |
| Neuromuscular junction | 2 | 2 | 2 | -- | 3 |
| Tarsal tunnel syndrome (unilateral) | 1 | 4 | 4 | -- | -- |
| Tarsal tunnel syndrome (bilateral) | 2 | 5 | 6 | -- | -- |
| Weakness, fatigue, cramps, or twitching (focal) | 2 | 3 | 4 | -- | 2 |
| Weakness, fatigue, cramps, or twitching (general) | 4 | 4 | 4 | -- | 2 |
| Pain, numbness, or tingling (unilateral) | 1 | 3 | 4 | 2 | -- |
| Pain, numbness, or tingling (bilateral) | 2 | 4 | 6 | 2 | -- |

Source: AMA, 2010.

Utilization of motor or sensory nerve conduction velocity studies at a frequency of 2 sessions per year would be considered appropriate for most conditions (e.g., unilateral or bilateral carpal tunnel syndrome,

radiculopathy, mononeuropathy, polyneuropathy, myopathy, and neuromuscular junction disorders). Nerve conduction velocity studies performed more frequently than twice a year may be reviewed for medical necessity.

- F-waves and H-reflex studies are performed to evaluate nerve conduction in portions of the nerve more proximal (near the spine) and, therefore, inaccessible to direct assessment using conventional techniques. Electrical stimulation is applied on the skin surface near a nerve site in a manner that sends impulses both proximally and distally. Characteristics of the response are assessed, including latency. Late responses provide information in the evaluation of radiculopathies, plexopathies, polyneuropathies (especially with multifocal conduction block or in suspected Guillain-Barré syndrome or chronic inflammatory demyelinating polyneuropathy), and proximal mononeuropathies. In some cases, they may be the only abnormal study.
- Motor and sensory NCV studies and late responses (F-waves and H-reflex studies) are often complementary and performed during the same evaluation.

H-Reflex Studies:

- Typically, only 2 H-reflex studies are performed in a given examination.
- H-reflex studies usually must be performed bilaterally because symmetry of responses is an important criterion for abnormality. When a bilateral H-reflex study is performed, the entire procedure must be repeated, increasing examiner time and effort; there are no economies of scale in multiple H-reflex testing.
- H-reflex studies usually involve assessment of the gastrocnemius/soleus muscle complex in the calf. Bilateral gastrocnemius/soleus H-reflex abnormalities are often early indications of spinal stenosis, or bilateral S1 radiculopathies.
- In rare instances, H reflexes need to be tested in muscles other than the gastrocnemius/soleus muscle, e.g., in the upper limbs. In conditions such as cervical radiculopathies or brachial plexopathies, an H-reflex study can be performed in the arm (flexor carpi radialis muscle). Other muscles that may be tested, although rarely, are the intrinsic small muscles of the hand and foot.

F-Wave Studies:

- Although the set-up for an F-wave study is similar to the set-up for a motor NCV study, the testing is carried out separately from motor NCV study, utilizing different machine settings and separate stimulation to obtain a larger number of responses (at least 10).
- The number of F-wave studies, which need to be performed on a given person, depends on the working diagnosis and the electrodiagnostic findings already in evidence. It may be appropriate in the same person to perform some motor NCV studies with an F-wave and others without an F-wave.

Blink Reflexes:

- Insurance Companies considers blink reflex testing medically necessary to evaluate disease involving the 5th or 7th cranial nerves or brainstem. Blink reflexes are considered experimental and investigational for all other indications. The blink reflex is an electrodiagnostic analog of the corneal reflex. The latency of the responses, including side-to-side differences, can help localize pathology in the region of the 5th or 7th cranial nerves, or in the brainstem. The latencies and amplitudes of directly elicited facial motor responses should be determined to exclude a peripheral abnormality if the blink reflexes are abnormal.
- Recordings should be made bilaterally with both ipsilateral and contralateral stimulation.