Electrodiagnostic Testing

Table of Contents

Related Policies

Competency in Electrophysiologic Testing

Policy Number	**359**
Original Effective Date:	1/1997
Current Approval Date:	4/23/20
Next Review:	4/2021
Category:	Imaging/Testing

Policy Statement

1. Optum* by OptumHealth Care Solutions, LLC considers electrodiagnostic testing to be a ***proven*** method of assessing patients with neuromuscular or suspected neuromuscular disorders i.e., myopathies, neuropathies, neuromuscular junction disorders, nerve compression syndromes and plexopathies.

2. When clinically indicated, the performance of nerve conduction velocity (NCV) studies without concurrent needle electromyography (EMG) is ***proven*** when the patient:
   - is receiving anticoagulant therapy or have bleeding/clotting disorders
   - has lymphedema
   - is being evaluated for carpal tunnel syndrome**
   - reports a susceptibility to recurrent systemic infections

3. The performance of electrodiagnostic (EDX) studies (collectively NCV and EMG)is ***unproven*** (not appropriate or not medically necessary) due to inadequate clinical evidence in peer reviewed medical literature when:
   - performed for screening purposes
   - performed absent a comprehensive history and complete neuromuscular exam
   - performed after a definitive diagnosis has been established
   - NCV is performed without concurrent needle electromyography (EMG) except for those circumstances described above

4. The performance of somatosensory evoked potential (SSEP) testing is ***proven*** for the following:
   - During spinal scoliosis surgery for the purpose of intraoperative monitoring
   - Suspected brain or spinal cord trauma
   - Coma
   - Diabetic peripheral neuropathy
   - Multiple sclerosis,
   - Myoclonus,
   - Nontraumatic spinal cord lesions (e.g., cervical spondylosis or myelopathy)
   - Spinocerebellar degeneration
   - Subacute combined degeneration of spinal cord.

5. The performance of somatosensory evoked potential (SSEP) testing is ***unproven*** (not appropriate or not medically necessary) for all other disorders not listed above as proven due to inadequate clinical evidence in peer reviewed medical literature.

Purpose

This policy has been developed as the clinical criterion that describes the position of Optum regarding the appropriate application of electrodiagnostic (electrophysiological) testing for the evaluation of neuromuscular disorders.

Key Policy Questions

1. *What test(s) have been established as most sensitive and specific for assessing patients with neuromuscular or suspected neuromuscular disease?*
2. *Are nerve conduction studies alone, in the absence of needle electromyography (EMG), reliable for assessing patients with suspected nerve root disorders?*
3. *Are Evoked Potentials a viable replacement for Needle EMG?*

Summary

- Electrodiagnostic (EDX) testing must be specifically designed by a clinically knowledgeable health care provider for each individual set of clinical circumstances following a comprehensive history and neurological (and neuromuscular) examination..
- In the absence of contraindications, concurrent needle electromyography (EMG) and nerve conduction studies (NCS) are the gold standard methodology for assessing the neurophysiologic characteristics of neuromuscular diseases.
- NCS are usually performed first and concurrently followed by needle EMG studies to evaluate for suspected radiculopathy, plexopathy, or motor neuron disease. Dissociation of NCS and needle EMG results into separate reports is inappropriate unless specifically explained by the physician and should be the exception
- The evidence does not support the sole use of F-wave and/or H-reflex tests for the evaluation of disorders affecting the peripheral nervous system.
- Clinical evidence does not support the use of dermatomal somatosensory evoked potential (DSSEP) testing for the evaluation of neuromuscular disorders.
- The use of somatosensory evoked potential testing for the purpose of evaluating for radiculopathies is unproven due to lack of clinical evidence in peer reviewed medical literature.
- The final interpretation of the EDX testing includes a synthesis of the patient's history, physical examination, and all EDX studies performed.

Scope

All in and out of network programs (exclusive of Medicare and Medicaid products for chiropractic) involving all provider types, where utilization review determinations about the appropriateness or medical necessity of electrodiagnostic testing services are rendered. This policy also serves as a resource for peer-to-peer interactions in describing the position of Optum on the application of electrophysiologic testing procedures.

Definitions

Electrodiagnostic testing – Electrodiagnostic/electrophysiological (EDX) testing is the recording, by means of needle and/or surface electrodes, and evaluation of electrical activity within the neuromuscular system. Types of EDX testing include, but are not limited to needle electromyography, nerve conduction velocity studies, and somatosensroy evoked potential testing.

Concurrent NCV/EMG testing – The performance of nerve conduction velocity studies with needle electromyography during the same session or not exceeding two business days between the two studies.

Description

Electrodiagnostic (EDX) services include a variety of electrophysiologic studies that are an important means of diagnosing motor neuron diseases, myopathies, radiculopathies, plexopathies, neuropathies, and neuromuscular junction disorders. EDX studies are also useful for the evaluation of tumors (extremity, spinal cord, and/or the peripheral nervous system), and in neurotrauma, low back pain, spondylosis and cervical/lumbosacral disc disorders.

The two major components of the EDX assessment are nerve conduction studies (NCS) and needle electromyography (EMG). NCS are performed to assess the integrity of the peripheral nervous system and diagnose related diseases. Needle EMG studies serve to complement NCS in differential diagnosis by providing individualized and real-time assessments. Needle electrodes are inserted one at a time into selected muscles for interpretation. These data are then synthesized by the EDX consultant along with the previously obtained patient history, and physical examination.

Background

Introduction

Electrodiagnostic (EDX) testing is the extension of a comprehensive history and neurological (and neuromuscular) examination. EDX studies are used to establish an accurate diagnosis for patients with symptoms suggestive of a neuromuscular disorder. The electrodiagnostic examination should develop dynamically, with appropriate modifications as information emerges, and should never devolve into rote information gathering. Each study must be guided by the examiner's knowledge of the patient's condition.

Electrodiagnostic testing must be specifically designed by a clinically knowledgeable health care provider *(see related policy)* for each individual set of clinical circumstances, then altered and modified according to the findings, which unfold during the examination. Modification of the electrophysiologic examination, as it progresses to an accurate diagnosis, requires extensive clinical knowledge of anatomy, physiology and biomedical electronics, as well as the techniques, pitfalls and limitations of applied clinical neurophysiology. The provider should be diligent in ascertaining waveforms with limited electrical interference and/or stimulus artifact that can obstruct data interpretation and affect the validity of the test.

In the absence of contraindications, concurrent needle EMG and NCS are the gold standard methodology for assessing the neurophysiologic characteristics of neuromuscular diseases.[1] Performed in combination, EMG and NCS testing are usually conducted several weeks after an initial injury; however, in some cases NCS may prove useful immediately after an acute nerve injury such as a suspected severed nerve.[1]

For the purposes of this policy, the nervous system can be broadly described as the central nervous system and the peripheral nervous system. The central nervous system (CNS) comprises the brain and spinal cord. Evoked potentials have been used to evaluate the CNS. The peripheral nervous system is composed of spinal anterior horn cells, nerve roots, and the peripheral nerves. Also of importance is the muscle and neuromuscular junction. The peripheral nervous system is evaluated by nerve conduction studies (nerve conduction velocity [NCV], F-wave, H-reflex) and Needle EMG.

Evoked Potentials

Somatosensory Evoked Potentials (SSEP) evaluate the entire length of the afferent pathways and may be useful in assessing suspected brain or spinal cord trauma, coma, diabetic peripheral neuropathy, multiple sclerosis, myoclonus, nontraumatic spinal cord lesions (e.g., cervical spondylosis or myelopathy), spinocerebellar degeneration, and subacute combined degeneration of spinal cord.[1]

The use of SSEP studies for disorders other than those listed above is considered unproven. There are a high percentage (65%) of false-negative findings in patients with lumbar radiculopathy due to a lack of standardization in technique and nomenclature, precise localization of neural generators, and elucidation of the various factors that affect the measurements.

Clinical evidence does not support the use of dermatomal somatosensory evoked potential (DSEP) testing. [13] The conclusions regarding the clinical utility of DSEP testing are inconsistent due to conflicting and divergent data.

Nerve Conduction Studies (NCS)

The peripheral nervous system is evaluated by nerve conduction studies (nerve conduction velocity (NCV), F-wave, H-reflex) and needle EMG. Nerve conduction studies assess the integrity of the peripheral nervous system. These studies evaluate for: nerve conduction velocity between two points along a peripheral nerve; distal latency; and amplitude (size and morphology). The number of nerves tested should be the minimum necessary to come to a conclusion.

NCS are usually performed first and then concurrently followed by needle EMG studies to evaluate for suspected radiculopathy, plexopathy, or motor neuron disease. Dissociation of NCS and needle EMG results into separate reports is inappropriate unless specifically explained by the physician and should be the exception. [3] “Nerve conduction studies performed independent of needle EMG may only provide a portion of the information needed to diagnose muscle, nerve root, and most nerve disorders. When the NCS is used on its own without integrating needle EMG findings or when an individual relies solely on a review of NCS data, the results can be misleading and important diagnoses may be missed. Patients may thus be subjected to incorrect, unnecessary, and potentially harmful treatment interventions.”[1]

**When clinically indicated, the evidence supports the use of nerve conduction studies performed without needle EMG in patients on anticoagulants or who have bleeding disorders, patients who have lymphedema, susceptibility to recurrent systemic infections, or patients who are being evaluated for carpal tunnel syndrome.[2,7] However, there is a growing body of literature to support the safety of needle EMG, in patients with and without increased bleeding risk.[14] Nevertheless, one must outweigh the risks with the benefits and the prudent provider should not exclude the needle portion of the exam entirely as concomitant injuries/disorders may be missed absent of such exam which can lead to misdiagnosis and improper treatment.[3] Nerve condition studies performed without needle EMG in situations other than those listed above are considered unproven.

A typical NCS examination should include the following:

- Development of a differential diagnosis by the qualified EDX consultant, based upon appropriate history and physical examination.

- NCS of a number of nerves by recording and studying the electrical responses from peripheral nerves or the muscles they innervate, followed by electrical stimulation of the nerve. Usually surface electrodes are used for both stimulation and recording. Needle electrodes may be indicated for special circumstances.
- Subsequent performance of complementary needle EMG studies, which are tailored to assess the individual presentation, to evaluate the differential diagnosis.

Needle Electromyography (EMG)

Needle Electromyography (EMG) is performed to evaluate the peripheral nerves, nerve roots, and muscles and is performed by placing a needle electrode into a specified point of a muscle. This examination requires the skills of a trained professional such as MD, DO, DC, or PT. Once the needle is inserted in the appropriate location of the muscle, the examiner will proceed to record and analyze its electrical activity. Needle EMG studies are interpreted in real time, as they are performed. Normal findings and abnormalities uncovered during the study are documented and interpreted.

A typical EMG examination includes the following:

- Development of a differential diagnosis by the qualified EDX consultant, based upon appropriate history and physical examination.
- Completion of the indicated NCS studies to evaluate the differential diagnosis and to complement the needle EMG studies
- Needle EMG testing of selected muscles. This is accomplished by inserting a needle electrode into appropriate muscles - one at a time.
- The muscle's electrical characteristics are measured at rest and during activity.
- The EDX consultant analyzes oscilloscope tracings and the characteristic sounds produced by electrical potentials.
- The final interpretation of the examination includes a synthesis of the patient's history, physical examination, and the preceding portions of the study.

Late Responses: F-wave & H-reflex

F-waves and H-reflexes, also known as late responses, are frequently performed in conjunction with nerve conduction studies and may aid in the in the evaluation of radiculopathies, plexopathies, polyneuropathies, and proximal mononeuropathies.[1] Clinical evidence does not support the use of F-wave and H-reflex tests for the diagnosis and evaluation of disorders affecting the peripheral nervous system, if they are conducted in the absence of needle electromyography and motor and sensory nerve conduction studies. In the absence of other testing, F-wave and H-reflex studies, in and of themselves, do not include critical information and standards medically necessary to reach conclusions on neuromuscular diagnoses.[8]

What are the Positions of Other Health Care Organizations?

Other healthcare organizations have evaluated the use of nerve conduction studies, needle EMG, and/or evoked potential studies in the clinical setting. [Table 1] The policies of these organizations are consistent. Concurrent nerve conduction velocity (NCV) studies and needle EMG comprise the electrodiagnostic evaluation for most nerve root and peripheral nerve presentations. NCV as a stand-alone examination is supported for select clinical situations. Neither evoked potentials nor late responses are supported as a sole modality used for diagnosis and management of radiculopathy.

Coding Information

Note: The Current Procedural Terminology (CPT) codes listed in this policy may not be all inclusive and are for reference purposes only. The listing of a service code in this policy does not imply that the service described by the code is a covered or non-covered health service. Coverage is determined by the member's benefit document.

Code	Description
95860	Needle electromyography; one extremity with or without related paraspinal areas
95861	Needle electromyography; two extremities with or without related paraspinal areas
95863	Needle electromyography; three extremities with or without related paraspinal areas
95864	Needle electromyography; four extremities with or without related paraspinal areas
95885	Needle electromyography, each extremity, with related paraspinal areas, when performed, done with nerve conduction, amplitude and latency/velocity study; limited (List separately in addition to code for primary procedure)
95886	Needle electromyography, each extremity, with related paraspinal areas, when performed, done with nerve conduction, amplitude and latency/velocity study; complete, five or more muscles studied, innervated by three or more nerves or four or more spinal levels (List separately in addition to code for primary procedure)
95907	Nerve conduction studies; 1-2 studies
95908	Nerve conduction studies; 3-4 studies
95909	Nerve conduction studies; 5-6 studies
95910	Nerve conduction studies; 7-8 studies
95911	Nerve conduction studies; 9-10 studies
95912	Nerve conduction studies; 11-12 studies
95913	Nerve conduction studies; 13 or more studies
95925	Short-latency somatosensory evoked potential study, stimulation of any/all peripheral nerves or skin sites, recording from the central nervous system; in upper limbs
95926	Short-latency somatosensory evoked potential study, stimulation of any/all peripheral nerves or skin sites, recording from the central nervous system; in lower limbs
95927	Short-latency somatosensory evoked potential study, stimulation of any/all peripheral nerves or skin sites, recording from the central nervous system; in the trunk or head
95999	Unlisted neurological or neuromuscular diagnostic procedure

References

1. American Association of Neuromuscular and Electrodiagnostic Medicine (AANEM). Recommended policy for electrodiagnostic medicine. Endorsed by the American Academy of Neurology, The American Academy of Physical Medicine and Rehabilitation, and The American Association of Electrodiagnostic Medicine. Updated 2004; Available at: http://www.aanem.org/

2. American Association of Neuromuscular & Electrodiagnostic Medicine. Needle EMG in certain uncommon clinical contexts. *Muscle Nerve* 2005; Mar;31(3):398-9.

3. American Association of Neuromuscular and Electrodiagnostic Medicine (AANEM). Proper performance and interpretation of electrodiagnostic studies. Position statement. 2006. Available at: http://www.aanem.org/

4. Bigos S. Acute Low Back Problems in Adults: Assessment and Treatment. *U.S. Dept. of HHS, Agency for Health Care Policy and Research* 1994.

5. Bogduk N, McGuirk B Medical Management of Acute and Chronic Back Pain: An Evidence-Based Approach 2002; *Elsevier*: Amsterdam, The Netherlands

6. Cohen N. Electrodiagnostic Testing in Chiropractic Practice (letter). Albany (NY): *The NYS Education Dept/State Board for Chiropractic* 2001

7. Jablecki CK, Andary MT, Floeter et al.; 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. Available at: http://www.neurology.org/

8. Kimura J. Electrodiagnosis in Diseases of Nerve and Muscle: Principles and Practice. *F.A. Davis Company* 1989.

9. Mumby RC, et al. Universe of Florida Patients with Neck Pain or Injury. Tallahassee (FL): *Florida Agency for Health Care Administration* 1996.

10. Mumby RC, et al. Universe of Florida Patients with Low Back Pain or Injury. Tallahassee (FL): *Florida Agency for Health Care Administration* 1996.

11. Nachemson A. Neck and Back Pain: The Scientific Evidence of Causes, Diagnosis and Treatment. *Lippincott Williams & Wilkins* 2000.

12. Waddell G. The Back Pain Revolution. *Churchill Livingstone* 2004.

13. American Academy of Neurology (AAN). Assessment: Dermatomal Somatosensory Evoked Potentials. Report of the American Academy of Neurology's Therapeutics and Technology Assessments Subcommittee November 5, 1995. Approved by the AAN Practice Committee December 8, 1995. Approved by the AAN Executive Board January 15, 1996. Current guideline reaffirmed October 17, 2003.

14. American Association of Neuromuscular and Electrodiagnostic Medicine (AANEM) What are the risks associated with performing an electromyography (EMG) on a patient taking blood thinners? Available at: http://www.aanem.org.

Table 1

What are the Policies/Positions of Other Healthcare Organizations?

Organization	Policy Information	Position / Policy
Aetna	Clinical Policy Bulletin: Nerve Conduction Velocity Studies # 0502 Accessed January 2020	EMG recording is usually performed during the same patient encounter in order to carry out a more in-depth evaluation of the clinical question being investigated.
Amerigroup Realsoulutions in healthcare (formerly Anthem)	EMG/NCV #CG-MED-24 Accessed January 2020	Needle EMG and NCS typically comprise the Electrodiagnostic evaluation of function of the motor neurons, nerve roots, the peripheral nerves, the neuromuscular junction, and the skeletal muscles. NCS performed without needle EMG at the same time is considered not medically necessary except the limited clinical situations
CIGNA	Nerve Conduction Velocity Studies Including Late Responses # 0117 Accessed January 2020	NCV studies performed without needle EMG, other than when performed for follow-up testing, with current use of anticoagulants, the presence of lymphedema, for carpal tunnel syndrome, or if the individual cannot tolerate the NEMG procedure are considered experimental, investigational, or unproven.
CIGNA	Somatosensory Evoked Potentials #0122 Accessed January 2020	SSEPs for ANY other indication, including the evaluation of disorders of the lumbosacral roots, such as radiculopathies, thoracic root disorders, or cervical root disorders are considered experimental, investigational or unproven and not medically necessary for these indications.
UnitedHealthcare Oxford	Neurophysiologic Testing and Monitoring # 047.22 T2 Accessed January 2020	Nerve Conduction Studies Performed in Conjunction with Needle Electromyography Nerve conduction studies with or without late responses (e.g., F-wave and H-reflex tests) and neuromuscular junction testing are proven and medically necessary when performed in conjunction with needle electromyography for any of the following known or suspected disorders (see policy for list of disorders)
BlueCross BlueShield of North Carolina	Electrodiagnostic Studies Accessed January 2020	Electrodiagnostic studies are not covered for the following: 1. When the criteria listed above are not met, 2. Nerve Conduction Studies are considered investigational for screening, 3. Nerve Conduction Studies without needle EMG are considered not medically necessary,*** 4. Electrodiagnostic studies that are not onsite and not in real time. 5. When performed by providers without appropriate training and education as stated in the Policy Guidelines.
BlueCross BlueShield of Kansas	Electromyography (EMG), Nerve Conduction Studies (NCS), and Other electrodiagnostic (EDX) Related Services Accessed January 2020	Testing should be performed using EDX equipment that provides assessment of all parameters of the recorded signals. Studies performed with devices designed only for “screening purposes” rather than diagnosis, are not medically necessary.

Policy History/Revision Information

Date	Action/Description
3/08/2007	Utilization Management Committee approved inactivation of the policy
4/12/2007	Quality Improvement Committee approved inactivation of policy
12/11/2008	Policy revised: re-titled (Electrodiagnostic Testing); placed into new format; and submitted to UMC for approval
1/15/2009	Revised policy approved by QIC
4/30/2009	Annual review and approval completed
4/08/2010	Annual review and approval completed
10/26/2010	Policy rebranded to "OptumHealth Care Solutions, Inc. (OptumHealth)"
4/07/2011	Annual review and approval completed
4/19/2012	Annual review and approval completed
4/18/2013	Annual review and approval completed. Updated section describing the circumstances where NCV alone is clinically appropriate. CPT code list updated.
4/17/2014	Annual review and approval completed. Updated Table 1 and the References section. Policy rebranded "Optum* by OptumHealth Care Solutions, Inc."
4/16/2015	Annual review and approval completed. References and Table 1 updated
4/21/2016	Annual review and approval completed. References and Table 1 updated
4/20/2017	Annual review and approval completed. References and Table 1 updated. Legal entity name changed from "OptumHealth Care Solutions, Inc." to "OptumHealth Care Solutions, LLC."
4/26/2018	Annual review and approval completed. References and Table 1 updated
4/25/2019	Annual review and approval completed. References and Table 1 updated
4/23/2020	Annual review and approval completed. References and Table 1 updated

Contact Information

Please forward any commentary or feedback on Optum utilization management policies to: policy.inquiry@optumhealth.com with the word "Policy" in the subject line.

The services described in Optum* by OptumHealth Care Solutions, LLC policies are subject to the terms, conditions and limitations of the Member's contract or certificate. Optum reserves the right, in its sole discretion, to modify policies as necessary without prior written notice unless otherwise required by Optum's administrative procedures.

Certain internal policies may not be applicable to self-funded members and certain insured products. Refer to the member's Summary Plan Description (SPD) or Certificate of Coverage (COC) to determine whether coverage is provided or if there are any exclusions or benefit limitations applicable to any of these policies. If there is a difference between any policy and the member's SPD or COC, the member's SPD or COC will govern.