# Molina Clinical Policy
# Intraoperative Neurophysiologic Monitoring (IONM)
# Policy No. 481

**Last Approval: 04/08/2026**
**Next Review Due By: April 2027**

## DISCLAIMER

This Molina Clinical Policy (MCP) is intended to facilitate the Utilization Management process. Policies are not a supplementation or recommendation for treatment; Providers are solely responsible for the diagnosis, treatment, and clinical recommendations for the Member. It expresses Molina's determination as to whether certain services or supplies are medically necessary, experimental, investigational, or cosmetic for purposes of determining appropriateness of payment. The conclusion that a particular service or supply is medically necessary does not constitute a representation or warranty that this service or supply is covered (e.g., will be paid for by Molina) for a particular Member. The Member's benefit plan determines coverage – each benefit plan defines which services are covered, which are excluded, and which are subject to dollar caps or other limits. Members and their Providers will need to consult the Member's benefit plan to determine if there are any exclusion(s) or other benefit limitations applicable to this service or supply. If there is a discrepancy between this policy and a Member's plan of benefits, the benefits plan will govern. In addition, coverage may be mandated by applicable legal requirements of a State, the Federal government or CMS for Medicare and Medicaid Members. CMS's Coverage Database can be found on the CMS website. The coverage directive(s) and criteria from an existing National Coverage Determination (NCD) or Local Coverage Determination (LCD) will supersede the contents of this MCP and provide the directive for all Medicare members. References included were accurate at the time of policy approval and publication.

## OVERVIEW

**Intraoperative Neurophysiologic Monitoring (IONM)** modalities assess the function of the brain, brainstem, spinal cord, cranial nerves, and peripheral nerves during a procedure with the aim to detect and prevent neurologic injury. There are multiple IONM modalities that can be used in isolation or together to monitor different neural pathways such as, evoked potentials, electromyography, and electroencephalography. Electromyography (EMG) monitors motor nerve activity via subdermal or intramuscular electrodes and is often used in spinal surgery. Electroencephalography (EEG) monitors the electrical activity in the cerebral cortex via scalp electrodes and is best utilized when monitoring cerebral blood flow is imperative (e.g., neurovascular surgeries, epilepsy surgery). Evoked potentials are used to assess specific neural pathways. Brainstem auditory evoked potentials (BAEP) monitor auditory nerve function and are used in posterior fossa surgeries when hearing is at risk. Somatosensory evoked potentials (SSEP) monitor motor and sensory peripheral nerves and are best used during posterior spine surgery (Ghatol & Widrich 2023; Hemmer & Rabai 2025).

IONM is different than the monitoring of a neuromuscular blockade when the intention is to monitor the effects and depth of anesthesia. Quantitative measurements of neuromuscular function are preferred, such as accelerometry, EMG, and kinemyography. However, qualitative monitoring may be used to determine the depth of anesthesia. Train of four testing is most commonly used for this indication and tests neuromuscular function via a peripheral nerve stimulator (Renew 2026). Neuromuscular blockade monitoring is considered integral to anesthesia and not a separately reimbursable monitoring modality.

## COVERAGE POLICY

### Prior Authorization Criteria

**Continuous intraoperative monitoring (IONM)** may be **considered medically necessary** when ALL the following criteria are met:

1. ALL the following documentation must be present in the Member's medical record:
    a. Relevant medical history, physical examination, and results of pertinent diagnostic tests or procedures that support medical necessity of surgery and IONM
    b. Anatomic location of the planned surgical procedure
    c. Surgeon's rationale for the location and modalities to be monitored reflecting necessity for IONM
    d. Name and credentials of specialty trained physician or certified professional practicing within the scope of their license who will oversee the IONM

2. IONM will be performed by a specialty trained physician or a certified professional practicing within the scope of their license, who is NOT a member of the surgical team, and who is contemporaneously interpreting the continuous interoperative monitoring data during the operation and giving undivided 1:1 attention to the Member during the surgery (Note: IONM is not separately reimbursable when performed by a member of the surgical team)

3. Procedural criteria are met for at least ONE of the tests below (more than one IONM modality may be considered necessary if procedure is appropriate for the tests requested):
    a. *Electromyographic (EMG)* monitoring for ONE of the following indications:
        i. Monitor muscles innervated by the facial nerve during ear canal, mastoid/temporal bone, vestibular or parotid gland surgery, cochlear implant surgery, or intracranial surgery in the posterior fossa
        ii. Monitor muscles innervated by a cranial nerve during surgical excision of neuroma of that nerve or placement of a stimulator on a cranial nerve, or for muscles innervated by multiple cranial nerves during resection of skull base tumors
        iii. Monitor muscles innervated by the nerves in the brachial plexus during brachial plexus surgery
        iv. Monitor muscles at or below the level of surgery for the following:
            1. Selective dorsal rhizotomy when selection criteria are met
            2. Resection of spinal cord tumor
            3. Tethered cord release (includes monitoring of sphincters)
        v. Monitoring of the recurrent laryngeal nerve during thyroid or parathyroid procedures
        vi. Monitoring during complex cervical spine procedures (e.g., tumor or intramedullary lesion, traumatic injury, significant deformity or instability, ossification of the posterior longitudinal ligament, or severe cord compression)
        vii. Monitoring during complex lumbar instrumented fusions (e.g., L3 – sacrum, adult deformity) to assist with instrumentation placement (Note: See reimbursement conditions below in Limitations and Exclusions)
    b. *Somatosensory evoked potentials (SEPs, SSEPs)* and/or *motor evoked potentials (MEPs)* at or below the level of the surgery to monitor the integrity of the spinal cord to detect adverse changes before they become irreversible for ONE of the following indications:
        i. High-risk spinal procedures, when the integrity of the spinal cord or spinal tracts are at risk (e.g., spinal cord decompression/stabilization, anterior and posterior spinal fusions, tethered cord release, spina bifida correction, resection of the tumor, cyst, aneurysm or arteriovenous malformation of the spinal cord)
        ii. Intracranial procedures, when the integrity of the spinal cord or spinal tracts are at risk (e.g., craniotomy for tumor removal, craniotomy for aneurysm repair, arteriovenous malformation repair, localization of cortex during craniotomy, thalamotomy)
        iii. Vascular procedures in which the integrity of the spinal cord is at risk (e.g., circulatory arrest with hypothermia without bypass, distal aortic procedures, aortic arch surgeries, carotid artery surgeries, arteriography with test occlusion of the carotid artery)
        iv. Pelvic fracture surgery
        v. Complex cervical spine procedures (e.g., tumor or intramedullary lesion, traumatic injury, significant deformity or instability, ossification of the posterior longitudinal ligament, or severe cord compression)
    c. *Brain Stem Auditory Evoked Response (BAER/ABR)* during posterior fossa surgery (e.g., Chiari decompression, microvascular decompression, brainstem tumor resection, vestibular schwannomas)
    d. *Electroencephalogram (EEG)* monitoring for ONE the following indications:
        i. Carotid endarterectomy
        ii. Intracranial neurovascular surgery
        iii. Intracranial supratentorial tumor resection surgery
        iv. Intracranial surgery involving the skull base, posterior fossa, and/or brainstem
        v. Epilepsy surgery (specifically electrocorticography)
        vi. Intracranial interventional radiology procedures

**Remote continuous intraoperative monitoring (IONM)** may be **considered medically necessary** when ALL the above continuous IONM criteria are met AND documentation that a trained technician will be in continuous attendance in the operating room, and they will have real time communication (either auditory or written) with both the operating surgeon and monitoring physician. Without immediate communication to the operating team of potential adverse changes, there would be no purpose to baseline studies or surgical continuous IONM monitoring and the requested IONM services and all associated codes will not be approved. Note that for reimbursement, the additional documentation outlined below may be required.

## Reimbursement Criteria

**Continuous intraoperative monitoring (IONM)** may be **eligible for reimbursement** when ALL the following criteria are met:

1. Member met ALL the above prior authorization medical necessity requirements for IONM,
   Note: If the IONM services are not approvable (CPT 95940, G0453) none of the additional neuromonitoring codes are approvable

2. Baseline electrodiagnostic studies are documented in the Member's medical record:
   a. Documentation of contemporaneous interpretation prior to the surgical procedure
   b. Results of testing of multiple leads for signal strength, clarity, amplitude, etc.
   c. Time spent performing or interpreting the baseline electrophysiologic studies prior to surgery
      Note: Baseline studies are not counted as intraoperative monitoring and are separately reportable ONCE per operative session. Testing performed during surgery does not qualify as baseline testing and is not a separately reportable procedure. The baseline modalities are determined by the criteria for monitoring modalities and are considered medically necessary and separately reimbursable ONLY if criteria for IONM has been met.

3. Operative note in Member's medical record detailing ALL the following:
   a. Name and credentials of specialty trained physician or certified professional practicing within the scope of their license who oversaw the IONM
   b. Name and credentials of trained technologist present in the operating room
   c. Communication with the operating surgeon
   d. Whether the IONM did or did not remain stable, and if not, what interventions were performed
      i. For evoked potentials monitoring, report should note which nerves were tested, latencies at various testing points, and an evaluation of whether the resulting values are normal or abnormal
   e. Start and stop times of the monitoring services provided

**Remote continuous intraoperative monitoring (IONM)** may be **eligible for reimbursement** when ALL the following criteria are met:

1. Member met ALL the above prior authorization medical necessity requirements for IONM
   Note: If the IONM services are not approvable (CPT 95940, G0453) none of the additional neuromonitoring codes are approvable

2. Operative note in Member's medical record detailing ALL the following:
   a. Name and credentials of specialty trained physician or certified professional practicing within the scope of their license who oversaw the IONM
   b. Name and credentials of trained technologist who was physically present in the operating room
   c. What was communicated during the service, who was involved in the communication, how it was communicated, and any other information during the monitoring
   d. Whether the IONM did or did not remain stable, and if not, what interventions were performed
   e. Details of the audio and visual connection established, including the specific type of audio and video connection (e.g., VOiP or screen monitoring)
   f. Confirmation of a verbal baseline review, prior to surgery start, between the monitoring physician and surgeon using the audio connection
   g. Communication log (verbal or written) between the monitoring physician and surgeon of any events during surgery
   h. Confirmation of verbal closing review between monitoring physician and surgeon
   i. Start and stop times of the monitoring services provided

## Limitations and Exclusions

1. IONM in situations where historical data and current practices reveal no potential for damage to neural integrity during surgery is considered **experimental, investigational, and unproven** due to insufficient evidence in the peer-reviewed medical literature to establish long-term safety, efficacy, and effect on net health outcomes

2. IONM during the following procedures is considered **experimental, investigational, and unproven** due to insufficient evidence in the peer-reviewed medical literature to establish long-term safety, efficacy, and effect on net health outcomes:

   a. Lumbar spine surgery below the end of the spinal cord at L1/2, unless used for instrumentation placement
   b. Cervical spine surgery in the absence of tumor or intramedullary lesion, traumatic injury, significant deformity or instability, ossification of the posterior longitudinal ligament, or severe cord compression
   c. Sacroiliac joint injections or fusion
   d. Epidural (interlaminar and transforaminal), facet, or other diagnostic/therapeutic injections
   e. Radiofrequency ablation/denervation procedures
   f. Placement of a spinal cord or dorsal root ganglion stimulator or intrathecal pain pump
   g. Carpal tunnel release
   h. Shoulder, elbow, wrist, hip, or knee surgery (including surgery for fractures and epiphyseal and hemiepiphyseal arrest due to hemiepiphyseal dysplasia of the distal femur, and proximal and distal tibia)
   i. Neuroplasty of the pudendal nerve
   j. Transvenous embolization of carotid-cavernous fistulas
   k. Coccygectomy

3. The following IONM procedures are considered **experimental, investigational, and unproven** due to insufficient evidence in the peer-reviewed medical literature to establish long-term safety, efficacy, and effect on net health outcomes:
   a. Electromyography (EMG) monitoring during spinal surgery because there is insufficient evidence that this technique provides useful information to the surgeon in terms of assessing the adequacy of nerve root decompression, or detecting nerve root irritation
   b. EEG monitoring during spinal or posterior fossa surgery
   c. Nerve conduction studies without EMG
   d. Visual evoked potentials
   e. Surface electromyography

4. Baseline electrodiagnostic studies performed for the evaluation of neural integrity as part of a non-covered surgical procedure listed above, in the absence of intraoperative monitoring, are **not considered medically necessary**

5. Train-of-four monitoring is considered integral to intraoperative monitoring and/or administration of anesthesia and **will not be separately reimbursed**

6. Stimulus-triggered electromyography (EMG) is considered integral to intraoperative monitoring and/or the baseline surgical procedure when performed to aid placement of pedicle/facet screws and **will not be separately reimbursed**

7. For remote monitoring, the services of the technician in the room and the monitoring equipment are **not separately payable** from the reimbursement to the monitoring physician (or the monitoring company). Reimbursement for technician services and equipment may be negotiated directly with the facility

8. Post-operative SEP or MEP monitoring is considered **not medically necessary** for individuals who have undergone intraoperative SEP or MEP monitoring

**DOCUMENTATION REQUIREMENTS:** Molina Healthcare reserves the right to require that additional documentation be made available as part of its coverage determination; quality improvement; and fraud; waste and abuse prevention processes. Documentation required may include, but is not limited to, patient records, test results and credentials of the provider ordering or performing a drug or service. Molina Healthcare may deny reimbursement or take additional appropriate action if the documentation provided does not support the initial determination that the drugs or services were medically necessary, not investigational, or experimental, and otherwise within the scope of benefits afforded to the member, and/or the documentation demonstrates a pattern of billing or other practice that is inappropriate or excessive.

## SUMMARY OF MEDICAL EVIDENCE

The current medical evidence on intraoperative neurophysiologic monitoring (IONM) consists mainly of case series, retrospective reviews, and minimal RCTs. The literature generally supports the use of single or multimodal IONM in thyroid surgery (Aygun et al. 2025; Xin et al. 2025), spinal cord tumors (Azad et al. 2018; Rijs et al. 2019), carotid endarterectomy (Nwachuku et al. 2015), neurovascular procedures (Martinelli et al. 2025; Thirumala et al. 2016; Wang et al. 2025; Wilent et al. 2021), spinal surgery (Fehlings et al. 2024; Nuwer et al. 2012; Thirumala et al. 2017; Zanin et

al. 2025), and other procedures with neurologic injury risk (Guzzi et al. 2024; Oya et al. 2017). The evidence does not support the use of IONM in cervical spine surgery without tumor or intramedullary lesion, traumatic injury, significant deformity or instability, ossification of the posterior longitudinal ligament, or severe cord compression (Badhiwala et al. 2019; Reddy et al. 2021).

Limitations of the evidence available include a lack of high quality RCTs and point to a need for defining meaningful IONM alarm criteria and thresholds, creating standardized IONM alarm and intervention procedures, and addressing the rate of false-positives and false-negatives in different modalities. The literature also repeatedly confronts that while IONM has shown to be predictive and sensitive to injury, there remains an uncertain causal relationship between the use of IONM and increased positive patient outcomes (Rezapour et al. 2025).

**National and Specialty Organizations**

The **North American Spine Society (NASS)** published coverage recommendations titled *Intraoperative Neurophysiologic Monitoring* (2024) that recommends coverage for multimodal IONM during deformity corrections for scoliosis or other deforming dorsopathies in the cervical/thoracic/lumbar spine, spinal realignment procedures that involve significant distraction, interbody fusion procedures involving very significant disc space distraction in the cervical/thoracic/lumbar spine, spinal fracture procedures, resection of intradural or extradural diseases and neoplasms of the spinal cord or cauda equina, tethered cord release, selective dorsal rhizotomies, pediatric placement of growing instrumentation elements (rods, expandable ribs), embolization or resection of arteriovenous malformations (AVMs) of the spinal cord, and cervical/thoracic discectomy, fusion, or arthroplasty procedures involving decompression of the spinal cord in patients with spondylotic myelopathy, spinal cord compression, or vertebral artery compression syndrome. The recommendations stipulate indications for conditional and exceptional coverage. Additionally, the coverage state IONM coverage is not recommended in lumbar laminectomy and/or foraminotomy, lumbar discectomy, epidural injections, sacroiliac joint injections, discography, radiofrequency ablation/denervation rhizotomy procedures, placement of an intrathecal pain pump, and facet joint interventions.

The **American Academy of Neurology (AAN)** published a model coverage policy titled *Principles of Coding for Intraoperative Neurophysiologic Monitoring (IOM) and Testing* (2018) that detailed the indications for various IONM modalities. The model coverage policy supports the use of EEG monitoring during carotid surgery, SEP during spinal surgeries, combined MEP/SEP during spinal cord surgeries, EMG monitoring during selective posterior rhizotomy, and IONM during aortic surgeries. The model policy states IONM should be conducted and monitored by a well-trained, experienced technologist present at the operating site monitoring a single surgical case, and a monitoring clinical neurophysiologist supervising the technologist.

The **American Society of Neurophysiological Monitoring (ASNM)** published *Intraoperative somatosensory evoked potential (SEP) monitoring: An updated position statement by the American Society of Neurophysiological Monitoring* (Toleikis et al. 2024) discussing various aspects of SEP monitoring. The position states SEP monitoring is a useful compliment to MEP, EEG, and/or EMG monitoring dependent on the type of surgery being performed. SEP monitoring alone can be useful for brain monitoring during neurovascular procedures; however, there are limitations to SEP monitoring for neurovascular procedures, as they are only sensitive to ischemic events which affect the SEP generator sites and are thus insensitive to ischemic events in other areas of the brain.

The **American Society of Neurophysiological Monitoring (ASNM)** published *Intraoperative motor evoked potential monitoring – A position statement by the American Society of Neurophysiological Monitoring* (MacDonald et al. 2013) stating that MEP monitoring can be useful in any surgery risking motor system injury. The most common procedural indications are neurosurgical indications (e.g., tumor or epileptic focus resections near the motor cortex or corticospinal tract, intracranial aneurysm clipping, posterior fossa surgery, craniocervical junction and spinal operations, spinal cord procedures and tethered cord or cauda equina surgeries), orthopedic indications (e.g., spinal deformity or fracture surgery, vertebral tumor resections, and anterior cervical discectomy) and vascular indications (e.g., descending aortic procedures, spinal arteriovenous malformation interventions and carotid endarterectomy).

The **International Society of Intraoperative Neurophysiology** published *Recommendations of the International Society of Intraoperative Neurophysiology for intraoperative somatosensory evoked potentials* (MacDonald et al. 2019) stating that SEP monitoring is indicated for “any surgery tangibly risking dorsal somatosensory system injury”. MEP is recommended as a frequent complement IONM modality to SEP when motor injury is a risk. Specific surgery indications mentioned are Peri-Rolandic brain surgery, cerebrovascular surgeries, posterior fossa surgeries, complex orthopedic spine surgeries, complex spinal neurosurgeries, and descending aortic procedures.

The **National Institute for Health and Care Excellence (NICE)** recommends the use of intraoperative nerve monitoring during thyroid surgery per the HealthTech guidance HTG164.

## CODING & BILLING INFORMATION

**CPT (Current Procedural Terminology)**

| Code | Description |
|---|---|
| **95940** | Continuous intraoperative neurophysiology monitoring in the operating room, one on one monitoring requiring personal attendance, each 15 minutes (List separately in addition to code for primary procedure) |
| **95941** | Continuous intraoperative neurophysiology monitoring, from outside the operating room (remote or nearby) or for monitoring of more than one case while in the operating room, per hour (List separately in addition to code for primary procedure) |

**HCPCS (Healthcare Common Procedure Coding System)**

| Code | Description |
|---|---|
| **G0453** | Continuous intraoperative neurophysiology monitoring, from outside the operating room (remote or nearby), per patient, (attention directed exclusively to one patient) each 15 minutes (list in addition to primary procedure) |

**CODING DISCLAIMER:** Codes listed in this policy are for reference purposes only and may not be all-inclusive. Deleted codes and codes which are not effective at the time the service is rendered may not be eligible for reimbursement. Listing of a service or device code in this policy does not guarantee coverage. Coverage is determined by the benefit document. Molina adheres to Current Procedural Terminology (CPT®), a registered trademark of the American Medical Association (AMA). All CPT codes and descriptions are copyrighted by the AMA; this information is included for informational purposes only. Providers and facilities are expected to utilize industry standard coding practices for all submissions. When improper billing and coding is not followed, Molina has the right to reject/deny the claim and recover claim payment(s). Due to changing industry practices, Molina reserves the right to revise this policy as needed.

## APPROVAL HISTORY

**04/08/2026** New policy. IRO peer reviewed on April 1, 2026, by a practicing physician board certified in Neurophysiology.

## REFERENCES

1. American Academy of Neurology. Principles of Coding for Intraoperative Neurophysiologic Monitoring (IOM) and Testing. Model coverage policy. Published February 2010. Updated July 2018. Accessed March 23, 2026. https://www.aan.com/siteassets/home-page/tools-and-resources/practicing-neurologist--administrators/billing-and-coding/model-coverage-policies/18iommodelpolicy_tr.pdf
2. Azad TD, Pendharkar AV, Nguyen V et al. Diagnostic Utility of Intraoperative Neurophysiological Monitoring for Intramedullary Spinal Cord Tumors: Systematic Review and Meta-Analysis. Clin Spine Surg. 2018 Apr;31(3):112-119. doi: 10.1097/BSD.0000000000000558. PMID: 28650882.
3. Badhiwala JH, Nassiri F, Witiw CD, et al. Investigating the utility of intraoperative neurophysiological monitoring for anterior cervical discectomy and fusion: analysis of over 140,000 cases from the National (Nationwide) Inpatient Sample data set. J Neurosurg Spine. 2019 Mar 29;31(1):76-86. doi: 10.3171/2019.1.SPINE181110. PMID: 30925481.
4. Fehlings MG, Alvi MA, Evaniew N, et al. A Clinical Practice Guideline for Prevention, Diagnosis and Management of Intraoperative Spinal Cord Injury: Recommendations for Use of Intraoperative Neuromonitoring and for the Use of Preoperative and Intraoperative Protocols for Patients Undergoing Spine Surgery. Global Spine J. 2024 Mar;14(3_suppl):212S-222S. doi: 10.1177/21925682231202343. PMID: 38526921; PMCID: PMC10964898.
5. Ghatol D, Widrich J. Intraoperative Neurophysiological Monitoring. In: StatPearls [Internet]. Treasure Island, FL. Updated July 24, 2023. Accessed March 19, 2026. https://www.ncbi.nlm.nih.gov/books/NBK563203/
6. Guzzi G, Ricciuti RA, Della Torre A, et al. Neurophysiological Monitoring in Neurosurgery. J Clin Med. 2024 May 17;13(10):2966. doi: 10.3390/jcm13102966. PMID: 38792507; PMCID: PMC11122101.
7. Hemmer LB., Rabai F. Neuromonitoring in surgery and anesthesia. Updated October 20, 2025. Literature review current through Feb 2026. Accessed March19, 2026. https://www.uptodate.com.
8. Macdonald DB, Skinner S, Shils J, Yingling C; American Society of Neurophysiological Monitoring. Intraoperative motor evoked potential monitoring - a position statement by the American Society of Neurophysiological Monitoring. Clin Neurophysiol. 2013 Dec;124(12):2291-316. doi: 10.1016/j.clinph.2013.07.025. Epub 2013 Sep 18. PMID: 24055297.
9. MacDonald DB, Dong C, Quatrale R, Sala F, Skinner S, Soto F, Szelényi A. Recommendations of the International Society of Intraoperative Neurophysiology for intraoperative somatosensory evoked potentials. Clin Neurophysiol. 2019 Jan;130(1):161-179. doi: 10.1016/j.clinph.2018.10.008. Epub 2018 Nov 14. PMID: 30470625.
10. Martinelli R, Burattini B, D'Ercole M, D' Alessandris GQ, Izzo A, Montano N. The role of intraoperative neuromonitoring in microvascular decompression for trigeminal neuralgia: results from a systematic review of the literature. Neurosurg Rev. 2025 Jul 16;48(1):569. doi:

10.1007/s10143-025-03715-7. Erratum in: Neurosurg Rev. 2025 Nov 10;48(1):768. doi: 10.1007/s10143-025-03919-x. PMID: 40668304; PMCID: PMC12575535.
11. National Institute for Health and Care Excellence (NICE). Intraoperative nerve monitoring during thyroid surgery (HTG164). HealthTech guidance. Published March 26, 2008. Accessed March 24, 2026. https://www.nice.org.uk/
12. North American Spine Society (NASS). Intraoperative Neurophysiological Monitoring. NASS Coverage Recommendations. Published October 2024. Accessed March 23, 2026. https://www.spine.org/
13. Nuwer MR, Emerson RG, Galloway G, et al.; American Association of Neuromuscular and Electrodiagnostic Medicine. Evidence-based guideline update: intraoperative spinal monitoring with somatosensory and transcranial electrical motor evoked potentials*. J Clin Neurophysiol. 2012 Feb;29(1):101-8. doi: 10.1097/WNP.0b013e31824a397e. PMID: 22353994.
14. Nwachuku EL, Balzer JR, Yabes JG, Habeych ME, Crammond DJ, Thirumala PD. Diagnostic value of somatosensory evoked potential changes during carotid endarterectomy: a systematic review and meta-analysis. JAMA Neurol. 2015 Jan;72(1):73-80. doi: 10.1001/jamaneurol.2014.3071. PMID: 25383418.
15. Oya J, Burke JF, Vogel T, Tay B, Chou D, Mummaneni P. The Accuracy of Multimodality Intraoperative Neuromonitoring to Predict Postoperative Neurologic Deficits Following Cervical Laminoplasty. World Neurosurg. 2017 Oct;106:17-25. doi: 10.1016/j.wneu.2017.06.026. Epub 2017 Jun 12. PMID: 28619491.
16. Reddy RP, Chang R, Rosario BP, et al. What is the predictive value of intraoperative somatosensory evoked potential monitoring for postoperative neurological deficit in cervical spine surgery?-a meta-analysis. Spine J. 2021 Apr;21(4):555-570. doi: 10.1016/j.spinee.2021.01.010. Epub 2021 Jan 16. PMID: 33460808.
17. Rezapour A, Derakhshani N, Pouyan SN, et al. Safety and Efficacy of Intraoperative Neuromonitoring: An Umbrella Review. Health Sci Rep. 2025 Oct 13;8(10):e71370. doi: 10.1002/hsr2.71370. PMID: 41089530; PMCID: PMC12516239.
18. Renew JR. Monitoring neuromuscular blockade. Updated March 18, 2026. Literature review current through March 2026. Accessed March 19, 2026. https://www.uptodate.com.
19. Rijs K, Klimek M, Scheltens-de Boer M, Biesheuvel K, Harhangi BS. Intraoperative Neuromonitoring in Patients with Intramedullary Spinal Cord Tumor: A Systematic Review, Meta-Analysis, and Case Series. World Neurosurg. 2019 May;125:498-510.e2. doi: 10.1016/j.wneu.2019.01.007. Epub 2019 Jan 17. PMID: 30659972.
20. Thirumala PD, Crammond DJ, Loke YK, Cheng HL, Huang J, Balzer JR. Diagnostic accuracy of motor evoked potentials to detect neurological deficit during idiopathic scoliosis correction: a systematic review. J Neurosurg Spine. 2017 Mar;26(3):374-383. doi: 10.3171/2015.7.SPINE15466. Epub 2016 Dec 9. PMID: 27935448.
21. Toleikis JR, Pace C, Jahangiri FR, Hemmer LB, Toleikis SC. Intraoperative somatosensory evoked potential (SEP) monitoring: an updated position statement by the American Society of Neurophysiological Monitoring. J Clin Monit Comput. 2024 Oct;38(5):1003-1042. doi: 10.1007/s10877-024-01201-x. Epub 2024 Jul 27. PMID: 39068294; PMCID: PMC11427520.
22. Wang D, Tong J, Liu B, Li Y, Zhang X. Impact of intraoperative neurophysiological monitoring and anesthesia management parameters on postoperative recovery in patients undergoing complex intracranial aneurysm surgery. J Clin Neurosci. 2025 Dec;142:111631. doi: 10.1016/j.jocn.2025.111631. Epub 2025 Sep 24. PMID: 40997396.
23. Wilent WB, Belyakina O, Korsgaard E, et al. Intraoperative vascular complications during 2278 cerebral endovascular procedures with multimodality IONM: relationship between signal change, complication, intervention and postoperative outcome. J Neurointerv Surg. 2021 Apr;13(4):378-383. doi: 10.1136/neurintsurg-2020-016604. Epub 2020 Dec 22. PMID: 33443128.
24. Xin Y, Liu Y, Liu Y, Xie Q, Liu C, Xu G, Shang X. Intraoperative neuromonitoring reduces vocal cord injury in open thyroid cancer surgery: results from a randomized controlled trial. Surg Endosc. 2026 Feb;40(2):1620-1628. doi: 10.1007/s00464-025-12411-y. Epub 2025 Dec 3. PMID: 41340008; PMCID: PMC12881059.
25. Zanin L, Broglio L, Panciani PP, et al. Intraoperative Neurophysiological Monitoring in Contemporary Spinal Surgery: A Systematic Review of Clinical Outcomes and Cost-Effectiveness. Brain Sci. 2025 Jul 19;15(7):768. doi: 10.3390/brainsci15070768. PMID: 40722358; PMCID: PMC12293856.

## APPENDIX

***Reserved for State specific information.*** *Information includes, but is not limited to, State contract language, Medicaid criteria and other mandated criteria.*

**This policy contains prior authorization requirements.**