

NEUROPHYSIOLOGIC INTRAOPERATIVE MONITORING PRACTICE ANALYSIS

This Document represents a delineation of the tasks (T) performed and knowledge (K) applied by neurophysiologic intraoperative monitoring technologists in the practice of their profession. This practice takes place in the context of their unwavering commitment to patient care and safety and their adherence to the highest principles of ethical behavior.

(25%) Domain I – Preparation and Application of Fundamental Concepts

- T-1 Perform a risk assessment by reviewing planned intraoperative procedures and preoperative diagnostic test results to determine the structures at risk and the modalities that should be monitored.

The safe and effective performance of this task requires knowledge of:

- K-1 Medical terminology
- K-2 Evoked potentials, motor evoked potentials, EEG and EMG correlates of clinical entities
- K-3 General anatomy
- K-4 Risks associated with specific disorders/surgical procedures
- K-6 Medical conditions that may affect monitoring protocols
- K-38 Preoperative diagnostic tests (e.g., WADA, FMRI, MEG)

- T-2 Review patient history and medical conditions to identify pre-existing conditions that may affect the monitoring or outcomes.

The safe and effective performance of this task requires knowledge of:

- K-1 Medical terminology
- K-3 General anatomy
- K-5 Elements of a patient history
- K-6 Medical conditions that may affect monitoring protocols
- K-38 Preoperative diagnostic tests (e.g., WADA, FMRI, MEG)

T-3 Communicate the monitoring plan to the patient/caregivers in a manner consistent with their ability to understand in order to reassure the patient, establish rapport, and elicit cooperation.

The safe and effective performance of this task requires knowledge of:

- K-3 General anatomy
- K-7 Age-specific criteria
- K-8 Techniques for establishing rapport
- K-9 Cognitive limitations
- K-10 Surgery specific monitoring protocols

T-4 Determine the equipment and supplies required for the monitoring.

The safe and effective performance of this task requires knowledge of:

- K-1 Medical terminology
- K-3 General anatomy
- K-5 Elements of a patient history
- K-10 Surgery specific monitoring protocols
- K-11 Uses of stimulating electrodes, recording electrodes and modality devices
- K-32 Characteristics of the differential amplifier (e.g. polarity, CMRR)
- K-38 Preoperative diagnostic tests (e.g., WADA, FMRI, MEG)

T-5 Prepare the equipment and supplies for use.

The safe and effective performance of this task requires knowledge of:

- K-10 Surgery specific monitoring protocols
- K-12 Infection control
- K-13 ACNS Guidelines
- K-14 Effects of instrument settings (e.g. filters, display gain, epoch)
- K-15 Montage modifications
- K-24 Electrical safety techniques
- K-32 Characteristics of the differential amplifier (e.g. polarity, CMRR)

- T-6 Confirm the surgical plan and monitoring requirements with the surgical team in order to determine if adjustments must be made.

The safe and effective performance of this task requires knowledge of:

- K-1 Medical terminology
- K-3 General anatomy
- K-4 Risks associated with specific disorders/surgical procedures
- K-5 Elements of a patient history
- K-6 Medical conditions that may affect monitoring protocols
- K-10 Surgery specific monitoring protocols
- K-11 Uses of stimulating electrodes, recording electrodes and modality devices
- K-16 Effects of drugs/anesthetic agents on recordings
- K-17 Neuroanatomy: central and peripheral
- K-28 Modality specific potential waveforms
- K-31 Documentation and communication techniques
- K-38 Preoperative diagnostic tests (e.g., WADA, FMRI, MEG)

(66%) Domain II – Intraoperative Phase

- T-1 Measure and mark the patient to determine the electrode sites.

The safe and effective performance of this task requires knowledge of:

- K-3 General anatomy
- K-7 Age-specific criteria
- K-8 Techniques for establishing rapport
- K-9 Cognitive limitations
- K-12 Infection control
- K-13 ACNS Guidelines
- K-17 Neuroanatomy: central and peripheral
- K-18 Metric system
- K-19 Electrode placement systems (e.g. 10-20)

- T-2 Prepare the sites, securely apply recording and stimulating electrodes and check impedance.

The safe and effective performance of this task requires knowledge of:

- K-7 Age-specific criteria
- K-8 Techniques for establishing rapport
- K-9 Cognitive limitations
- K-12 Infection control
- K-20 Conditions affecting impedance
- K-21 Electrode application techniques (e.g. paste, collodion, needle electrodes)
- K-22 Significant patient factors (e.g. patient cooperation, pain tolerance, adequate twitch)
- K-23 Range of standard impedance values
- K-24 Electrical safety techniques

- T-3 Obtain and report pre-incision baseline values based on the risk assessment.

Perform assessment/measurement of peripheral systems relevant to the test modalities (visual, auditory, somatosensory, motor evoked potentials, EMG, EEG).

The safe and effective performance of this task requires knowledge of:

- K-2 Evoked potentials, motor evoked potentials, EEG and EMG correlates of clinical entities
- K-4 Risks associated with specific disorders/surgical procedures
- K-6 Medical conditions that may affect monitoring protocols
- K-7 Age-specific criteria
- K-10 Surgery specific monitoring protocols
- K-11 Uses of stimulating electrodes, recording electrodes and modality devices
- K-13 ACNS Guidelines
- K-14 Effects of instrument settings (e.g. filters, display gain, epoch)
- K-15 Montage modifications
- K-16 Effects of drugs/anesthetic agents on recordings
- K-17 Neuroanatomy: central and peripheral
- K-24 Electrical safety techniques
- K-26 Troubleshooting techniques
- K-27 Artifact identification, and elimination
- K-28 Modality specific waveforms
- K-29 Digital instrumentation concepts (e.g. S/N ratio, sampling rate, analog to digital conversion)
- K-30 Significant surgical events (e.g. clamping, rotation, distraction)

K-31 Documentation and communication techniques

T-4 Monitor neurophysiologic functioning during intraoperative procedures:

- **Motor evoked potentials**
- **Cortical mapping and EEG**
- **Evoked potentials (somatosensory, brainstem auditory, visual)**
- **EMG (peripheral and cranial)**

The safe and effective performance of this task requires knowledge of:

K-2 Evoked potentials, motor evoked potentials, EEG and EMG correlates of clinical entities

K-4 Risks associated with specific disorders/surgical procedures

K-6 Medical conditions that may affect monitoring protocols

K-7 Age-specific criteria

K-10 Surgery specific monitoring protocols

K-11 Uses of stimulating electrodes, recording electrodes and modality devices

K-13 ACNS Guidelines

K-14 Effects of instrument settings (e.g. filters, display gain, epoch)

K-15 Montage modifications

K-16 Effects of drugs/anesthetic agents on recordings

K-26 Troubleshooting techniques

K-27 Artifact identification, and elimination

K-28 Modality specific waveforms

K-29 Digital instrumentation concepts (e.g. S/N ratio, sampling rate, analog to digital conversion)

K-30 Significant surgical events (e.g. clamping, rotation, distraction)

K-31 Documentation and communication techniques

T-5 Modify or adjust the recording strategy and/or instrument parameters based on the technologist's evaluation of recorded data and the progress of the case.

The safe and effective performance of this task requires knowledge of:

K-2 Evoked potentials, motor evoked potentials, EEG and EMG correlates of clinical entities

K-3 General anatomy

K-4 Risks associated with specific disorders/surgical procedures

K-6 Medical conditions that may affect monitoring protocols

K-7 Age-specific criteria

K-10 Surgery specific monitoring protocols

- K-11 Uses of stimulating electrodes, recording electrodes and modality devices
- K-13 ACNS Guidelines
- K-14 Effects of instrument settings (e.g. filters, display gain, epoch)
- K-15 Montage modifications
- K-16 Effects of drugs/anesthetic agents on recordings
- K-17 Neuroanatomy: central and peripheral
- K-26 Troubleshooting techniques
- K-27 Artifact identification, and elimination
- K-28 Modality specific waveforms
- K-29 Digital instrumentation concepts (e.g. S/N ratio, sampling rate, analog to digital conversion)
- K-30 Significant surgical events (e.g. clamping, rotation, distraction)
- K-31 Documentation and communication techniques

T-6 Remove the electrodes from the patient and the equipment from the surgical field and clean the electrode sites.

The safe and effective performance of this task requires knowledge of:

- K-7 Age-specific criteria
- K-8 Techniques for establishing rapport
- K-12 Infection control
- K-22 Significant patient factors (e.g. patient cooperation, pain tolerance, adequate twitch)
- K-31 Documentation and communication techniques
- K-33 MSDS/OSHA standards

(6%) **Domain III - Post-Operative Phase**

- T-1 Ensure that the on-going physiologic and non-physiologic documentation of factors pertaining to the intraoperative monitoring and surgical procedure is complete and comprehensive.

The safe and effective performance of this task requires knowledge of:

- K-2 Evoked potentials, motor evoked potentials, EEG and EMG correlates of clinical entities
- K-6 Medical conditions that may affect monitoring protocols
- K-11 Uses of stimulating electrodes, recording electrodes and modality devices
- K-13 ACNS Guidelines
- K-16 Effects of drugs/anesthetic agents on recordings
- K-22 Significant patient factors (e.g. patient cooperation, pain tolerance, adequate twitch)
- K-26 Troubleshooting techniques
- K-27 Artifact identification, and elimination
- K-30 Significant surgical events (e.g. clamping, rotation, distraction)
- K-31 Documentation and communication techniques
- K-32 Significant patient factors (e.g. patient cooperation, pain tolerance, adequate twitch)

- T-2 Clean and disinfect reusable electrodes and equipment and dispose of non-reusable supplies.

The safe and effective performance of this task requires knowledge of:

- K-12 Infection control
- K-33 MSDS/OSHA standards

- T-3 Ensure that scheduled maintenance of equipment is performed.

The safe and effective performance of this task requires knowledge of:

- K-13 ACNS Guidelines
- K-39 Data management and storage

(3%) **Domain IV – Ethics and Professional Issues**

T-1 Ensure patient safety.

The safe and effective performance of this task requires knowledge of:

K-6 Contraindications for specific modalities

K-12 Infection control

K-24 Electrical safety techniques

K-33 MSDS/OSHA standards

K-35 Allergies/sensitivities (e.g. latex, tape)

T-2 Conduct practice in a manner consistent with the ABRET Code of Ethics.

The safe and effective performance of this task requires knowledge of:

K-36 The ABRET Code of Ethics

T-3 Maintain patient confidentiality.

The safe and effective performance of this task requires knowledge of:

K-36 The ABRET Code of Ethics

K-37 HIPAA standards

EVOKED POTENTIAL TECHNOLOGY PRACTICE ANALYSIS

Path II

Domain II – Performing the Evoked Potential Study

- T-1 Prepare the patient
- A. Measure and mark the patient to determine the electrode sites
 - B. Prepare the sites for recording and stimulating electrodes in order to reduce impedance
 - C. Securely apply the recording and stimulating electrodes
 - D. Check impedance to ensure electrode integrity

The safe and effective performance of this task requires knowledge of:

- K-8 Neuroanatomy: central and peripheral
- K-13 Age-specific criteria
- K-14 Techniques for establishing rapport
- K-15 Cognitive limitations
- K-17 Metric system
- K-18 Electrode placement (recording and stimulation)
- K-19 Infection control
- K-20 General anatomy
- K-21 Conditions affecting impedance
- K-22 Electrode application techniques (e.g. paste, collodion)
- K-23 MSDS/OSHA standards
- K-24 Characteristics of the differential amplifier (e.g. polarity, CMRR)
- K-25 Range of standard impedance values
- K-38 Allergies/sensitivities (e.g., latex, tape)

- T-2 Perform the evoked potential study according to ACNS Guidelines while ensuring the integrity of the data and equipment

The safe and effective performance of this task requires knowledge of:

- K-1 Elements of a patient history
- K-2 Medical terminology
- K-3 Effects of medications on patients and recordings
- K-4 Neurological Disorders (e.g. tumors, vascular disease)
- K-5 Psychiatric Disorders
- K-6 Toxic/metabolic disorders
- K-7 Head trauma
- K-8 Neuroanatomy: central and peripheral
- K-9 Evoked potential correlates to clinical entities
- K-12 Components of each evoked potential modality (e.g. stimulating and recording parameters, instruments, ancillary devices)
- K-13 Age-specific criteria

- K-15 Cognitive limitations
 - K-18 Electrode placement (recording and stimulation)
 - K-21 Conditions affecting impedance
 - K-24 Characteristics of the differential amplifier (e.g. polarity, CMRR)
 - K-26 ACNS Guidelines
 - K-27 Troubleshooting techniques
 - K-28 Artifact monitoring, identification, and elimination
 - K-29 Evoked potential waveforms (e.g. obligate waveforms, generator sites)
 - K-32 Digital instrumentation concepts (e.g. S/N ratio, sampling rate, analog to digital conversion)
 - K-39 Waveform analysis (latency and amplitude)
- T-3 Modify or adjust the recording strategy and/or instrument parameters based on the technologist's evaluation of recorded data to ensure a complete and comprehensive study

The safe and effective performance of this task requires knowledge of:

- K-1 Elements of a patient history
- K-2 Medical terminology
- K-3 Effects of medications on patients and recordings
- K-4 Neurological Disorders (e.g. tumors, vascular disease)
- K-5 Psychiatric Disorders
- K-6 Toxic/metabolic disorders
- K-7 Head trauma
- K-8 Neuroanatomy: central and peripheral
- K-9 Evoked potential correlates to clinical entities
- K-12 Components of each evoked potential modality (e.g. stimulating and recording parameters, instruments, ancillary devices)
- K-13 Age-specific criteria
- K-15 Cognitive limitations
- K-18 Electrode placement (recording and stimulation)
- K-21 Conditions affecting impedance
- K-24 Characteristics of the differential amplifier (e.g. polarity, CMRR)
- K-26 ACNS Guidelines
- K-27 Troubleshooting techniques
- K-28 Artifact monitoring, identification, and elimination
- K-29 Evoked potential patterns (e.g. obligate waveforms, generator sites)
- K-30 Effects of instrument settings (e.g. filters, display gain, epoch)
- K-31 Montage modifications
- K-32 Digital instrumentation concepts (e.g. S/N ratio, sampling rate, analog to digital conversion)
- K-39 Waveform analysis (latency and amplitude)

T-4 Remove the electrodes and clean the electrode sites

The safe and effective performance of this task requires knowledge of:

K-19 Infection control

K-23 MSDS/OSHA standards