Hackensack Meridian *Health*
Jersey Shore University Medical Center

# Electrodiagnostic Testing in the Operating Room

| Medical Staff Policies & Procedures | |
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**INTRODUCTION:**

Electrodiagnostic testing is frequently required during operative procedures. Electrodiagnostic techniques applied in the operating room include sensory evoked potentials, auditory evoked potentials, facial nerve monitoring, somatosensory evoked potentials, visual evoked potentials, EMG, triggered EMG, motor evoked potentials and intraoperative monitoring during spinal cord surgery. In order to ensure uniform quality of the service provided, the Department of Medicine/Neurology Section has established a standard for electrodiagnostic testing including issues related to equipment, technologists and supervising physicians.

**POLICY:**

In order to ensure sufficient volume and quality of service, intraoperative electrodiagnostic testing should be provided under the supervision of neurologists who have been credentialed by the Medical Staff. The provision of service will be governed by the following principles:

**A. Monitoring Systems**:

1. Before being placed into use, any system must be approved and inspected by the Department of Bioengineering and must comply with most recent standards with respect to total chassis leakage and limits for isolated patient connections.
2. All systems used in the operating room must be inspected at least biannually or as required by the Department of Bioengineering.
3. All intraoperative neurophysiologic monitoring equipment used in the operating room must be CMS compliant.

**B. Monitoring Techniques**:

1. Before any new electrophysiological monitoring technique is offered to the surgical staff, it is advisable that monitoring be applied to patients undergoing general anesthesia for procedures not affecting the central or peripheral nervous systems. Recordings should be repeated several times so that the evoked potential team becomes confident in the

techniques' ability to reliably record electrophysiologic waveforms continuously and its ability to interpret electrophysiologic changes induced by systemic factors.

2. In many cases it is advisable to measure those potentials in a contralateral organ system (e.g., brainstem auditory evoked potential, opposite arm or leg or opposite facial nerve) in order to determine whether a change in baseline reflects a focal or generalized process.
3. In the case of motor evoked potentials certain exclusion criteria should be adhered to (see attached).

**C. <u>Monitoring Team</u>**:

1. Structure of the Team:
   a. Appropriate intraoperative monitoring is best conducted using the team approach. The team should be composed of surgeons, electrophysiological technologists, neurologists/neurophysiologists and anesthesiologists. The surgeon should have a fundamental background in the neurophysiology of evoked potential monitoring as they may be called upon to participate in solving some of the problems that may arise from artifacts introduced by stimulating or recording electrodes.
   b. The monitoring team must have a thorough background in intraoperative monitoring and electrodiagnostic technique so that immediate feedback can be given to the surgical team and anesthesiologists should any new or unusual changes occur in the recorded waveforms.
   c. Monitoring should commence before any surgical manipulations in the central or peripheral nervous systems begins and should continue until the surgical procedure is terminated.
   d. The electrodiagnostic technologist should complete a log book on each patient. This log book should include the following entries:
      1. Timing of the procedure.
      2. Sequence of surgical manipulation of the central or peripheral nervous system.
      3. The use and timing of anesthetics and drugs.

**D. <u>Neurologists/Neurophysiologists</u>:**

1. The electrodiagnostic technologist should be under the direct (Level 2) supervision of trained clinical neurophysiologists who have extensive background and training in electrophysiologic monitoring and the fundamentals of clinical neurophysiology. He/She:
   a. Must be Board Eligible/ Board Certified in Neurology and be fellowship- trained or Board Certified in Neurophysiology.
   b. Must be an Active member of the medical staff in good standing having been credentialed through the Department of Medicine, Section of Neurology, and have achieved the rank of Attending status.
   c. FPPE plan will include 15 cases analyzed retrospectively/concurrently as determined by the Chief of the Neurology Section or his/her designee.
2. The neurologist/neurophysiologist is responsible for the provision of the technologist meeting the criteria below and insuring that technologists remain current in their field.
3. If necessary**,** the supervisor must be available for direct supervision of technicians during the time all cases are being performed in the operating room except for emergency cases.

4. The neurologist/neurophysiologist is responsible for the provision and maintenance of all monitoring equipment subject to inspection and certification by the hospital Biomedical Engineering Department.
5. All members of the panel must demonstrate continuing medical education with at least six (6) credit hours per year in neurophysiology. All physicians must comply within standard physician guidelines and parameters for physicians contracted for any work at Jersey Shore University Medical Center.
6. The supervising neurologist/neurophysiologist must comply with CMS requirements and guidelines and be available with coverage on a 24/7/365 basis.

**E**. **Electrodiagnostic Technologists:**

1. The electrodiagnostic technician must have a background in electrical safety and its relevance to patients in the operating room and a solid knowledge base in the pharmacologic, physiologic and pathophysiologic influences that may change or distort electrodiagnostic waveforms.
2. The electrodiagnostic technician must have a solid background in the influence of filter settings on the amplitude, duration and latency of electrophysiological potentials.
3. The electrodiagnostic technician must understand basic neuroanatomy and know physiology, the location of evoked potential generators and the pathways between generators, medical terminology, evoked potential correlates of specific neurologic, orthopedic, audiologic and visual disorders and must have a grasp of the pathologic and nonpathologic factors affecting evoked potentials and electrical hazards.

**F. Monitoring of Quality:**

The Section Chief of Neurology will develop a quality assurance program for intraoperative monitoring that will include at least the following:

1. To maintain quality and performance, a retrospective review of 10 random cases per year of all the cases performed at JSUMC (not of an individual neurophysiologist's IONM cases) will be performed by the Chief of the Neurology section or his/her designee.
2. Review of the patient log on a regular basis.
3. Review of any concerns raised by surgeons, anesthesiologists or nursing personnel in the operating room.
4. A report on volume and quality of intraoperative monitoring shall be issued by the section Chief of Neurology to the Chairman of the Department of Medicine for review at least annually.
5. The Chief of Neurology will update all involved Departments of any new changes in local, regional, and national standards on neurophysiologic monitoring and related procedures that are applicable.
6. The Chairman of the Department of Medicine and the Neurology Section Chief will have the responsibility for insuring that quality parameters are monitored and achieved, as well a managing and monitoring any contract with the physicians providing services in the operating room.
7. The Neurology Section Chief will communicate and work collaboratively with the Department Chairs of Medicine, Surgery, Orthopedics and Anesthesia in a continuing effort to improve the quality of patient care.

**REFERENCES:**

This policy is adapted from the position statement of the American Association of Neuromuscular and Electrodiagnostic Medicine, April 6, 2000.

**Attachment:**

Contraindications of the Use of Motor Evoked Potentials:

1. Seizure history
2. Craniotomy/skull defect
3. Stroke History
4. VP shunt
5. Cortical lesions (tumors, abscess, aneurysm, etc.)
6. Programmable implanted electrical devices (Pacemaker, AICDs, pumps, boney stimulators, etc.)
7. Cochlear implants