



COMMENTARY



Overview of Clinical Neurophysiology and its Diagnostic Methods

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Description

Clinical physiology departments conduct testing in fields such as nuclear medicine, clinical neurophysiology, and radiology. Clinical physiology tests are frequently performed by various organ-specific specialties in internal medicine, such as cardiology, pulmonology, nephrology, and others, in countries that lack this specialty.

Clinical neurophysiology is a discipline of medicine that studies the central and peripheral nervous systems by analysing both spontaneous and induced bioelectrical activity. It encompasses pathophysiology research as well as clinical diagnostic procedures for both central and peripheral nervous system illnesses. Clinical neurophysiology examinations are not restricted to those conducted in a laboratory. The electrical functioning of the brain, spinal cord, and nerves in the limbs and muscles are all measured throughout the tests. It can provide a detailed definition of the lesion's location, kind, and severity, as well as reveal the anomalies in question. Clinical neurophysiology is mostly used to diagnose rather than treat disorders because of these qualities.

Clinical neurophysiology departments are typically found in hospitals and are staffed by neurologists and neurosurgeons. These are often larger hospitals with more specialised staff. The principal diagnostic methods used in hospitals with clinical neurophysiology services include:

- Electromyography and nerve conduction studies are peripheral nervous system diagnostic techniques that are particularly helpful in diagnosing illnesses of the muscles, nerves, and nerve roots. The electrical activity of muscles and their passage along nerves in the limbs is recorded. The majority of nerve-muscle diseases fall into one of two categories: morphologic or physiologic, both of which can be detected within the motor unit. These conditions might be acute or develop gradually. Here is a link to an online programme that permits in-

teractive investigation of these neurophysiological approaches and the symptoms that they are linked to.

- Electroencephalography (EEG) is a diagnostic test of thalamocortical rhythms (brain waves) that can be used to assess seizures and other central nervous system problems. This is accomplished by attaching electrodes to the scalp's surface to record currents from the cerebral cortex.
- Evoked potentials are a diagnostic test that evaluates particular central and peripheral nervous system pathways. Evoked potentials might be visual, auditory, or somatosensory. These capture the brain's and spinal cord's electrical responses to sensory stimuli.

Clinical neurophysiology includes electrodiagnostic medicine. The peripheral nervous system, rather than just the central nervous system, is the focus of electrodiagnostic medicine. A clinical neurophysiologist is trained to perform all of the following procedures: EEG, intraoperative monitoring, nerve conduction studies, EMG, and evoked potentials, whereas an electrodiagnostic physician mostly performs nerve conduction studies, needle EMG, and evoked potentials. Here, Intraoperative Neurophysiological Monitoring (IONM) or intraoperative neuromonitoring is the use of electrophysiological methods such as Electroencephalography (EEG), Electromyography (EMG), and evoked potentials to monitor the functional integrity of certain neural structures during surgery, such as nerves, spinal cord, and brain parts. The goal of IONM is to limit the risk of iatrogenic nervous system damage in patients and to provide functional guidance to surgeons and anesthesiologists.

Neurologists and neurosurgeons work primarily in clinical neurophysiology divisions in hospitals. These are usually larger hospitals with more specialised staff units. Clinical neurophysiologists are in charge of assessing and reporting on tests performed within the department.