



NATIONAL COMPETENCIES FOR PERFORMING AN ELECTROENCEPHALOGRAM

The American Society of Electroneurodiagnostic Technologists, Inc. presents this document to provide the national criteria for evaluating competencies for technologists performing an electroencephalogram (EEG). These competencies were established following a survey of the membership in the Fall of 1996. The Professional Testing Corporation (PTC) in New York City completed the survey process and provided the analysis. The ASET Board of Trustees approved this document August 11, 1997.

The elements necessary for quality patient care and interaction as well as basic knowledge and technical performance were considered. The technical components include those defined in the publication *Guidelines in EEG, Evoked Potentials, and Polysomnography 1994*, authored by the American Clinical Neurophysiology Society (formerly the American EEG Society).

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The technologist provides a safe recording environment by:

- verifying identity of patient;
- cleaning electrodes after each procedure;
- following universal precautions for infection control;
- attending to patient needs appropriately;
- recognizing/responding to life-threatening situations;
- being certified to perform CPR;
- following laboratory protocols for sedation;
- complying with lab protocols for emergency and disaster situations;
- complying with hazardous material handling procedures;
- maintaining instrument/equipment in good working order; and
- taking appropriate precautions to ensure electrical safety.

The technologist establishes rapport with the patient and patient's family by:

- using personal communication skills to achieve patient relaxation/cooperation;
- explaining all test procedures including activation procedures;
- explaining the electrode application method (paste, collodion, etc.);
- interacting on a level appropriate to patient's age and mental capacity; and
- maintaining respect and patient confidentiality.

The technologist evaluates the patient to:

- determine the patient's mental age, mental state, and comprehension level;
- note the patient's overall physical condition;
- decide appropriate method of electrode application;
- ascertain the patient's capacity to cooperate with activation procedures;
- determine if hyperventilation is contraindicated;
- accommodate for disabilities or special needs;
- determine the need for additional physiological monitors;
- document unusual or inappropriate behavior suggestive of seizure or pseudo seizure; and
- determine the possible need for restraints or emergency intervention.

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The technologist prepares a basic data sheet ("tech sheet") that includes:

- patient information (name, age, ID number, doctor, etc.);
- recording time, date, and technologist's name or initials;
- noting pertinent patient history and familial medical history;
- listing current medications/sedation and time of last dosage;
- noting time of last meal;
- noting time, date, aura, and circumstances of last seizure or symptoms;
- specifying the patient's mental, behavioral, and consciousness states;
- diagramming skull defects or anomalies (if any); and
- diagramming any modifications in electrode placement.

The technologist's electrode application follows a method that includes:

- measuring and marking the head following the 10/20 measurement system;
- adjusting electrode placement for anatomical defects or anomalies;
- prepping patient's scalp prior to electrode application;
- applying electrodes with paste or with collodion and electrolyte; and
- verifying electrode impedances are balanced and below 5,000 Ohms.

The technologist documents the working condition of an analog EEG instrument by:

- calibrating with a square wave to:
 - verify standard filter and sensitivity settings
 - verify or adjust mechanical baseline
 - verify or adjust electrical baseline
 - verify or adjust time axis
 - verify or adjust pen deflection.
- imputing a biological signal (bio-cal) into all channels;
- calibrating, at the end, on all filter and sensitivity settings utilized during the EEG; and
- recognizing/correcting any malfunctions seen with calibration.

The technologist documents the working condition of a digital EEG instrument by:

- calibrating system amplifiers;
- verify standard filter settings;
- verify sensitivity settings;
- imputing a biological (bio-cal) signal to all channels; and
- corrects or reports deviations as appropriate.

The technologist obtains a standard EEG that includes:

- at least 20 minutes of technically acceptable recording (120 pages);
- eye opening and closing to check effects of stimuli on EEG;
- hyperventilation for a minimum of 3 minutes;
- photic stimulation at frequencies appropriate for history & reactivity;
- mental stimulation/assessment procedures;
- periodic checks of electrode impedance;
- natural drowsiness and sleep, if possible;
- notations of montage, filters, paper speed, & sensitivity setting changes; and
- notes on observed behavior, clinical seizure manifestations, etc.

The technologist customizes the recording procedure by:

- evaluating reason for referral, history, and observed waveforms;
- utilizing techniques to bring out or enhance clinical symptoms;
- selecting montages appropriate for abnormalities seen and/or expected;
- selecting appropriate instrument settings;
- encouraging drowsiness and sleep;
- applying additional electrodes to localize abnormal activity;
- monitoring respiration if appropriate; and
- monitoring ECG rhythms for abnormality.

The technologist understands and follows technical criteria for:

- recording electrocerebral inactivity (brain death);
- recording neonatal EEG;
- recording pediatric EEG; and
- recording in intensive care or cardiac care units.

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The technologist differentiates artifacts from cerebral waveforms by:

- recognizing possible artifactual waveforms;
- documenting (on the recording) patient movements;
- applying/recording leads for eye potentials;
- applying/recording leads for ECG;
- replacing electrodes exhibiting questionable activity or contact; and
- troubleshooting for possible electrical interference.

When the EEG recording is finished the technologist:

- removes electrode paste/glue from the patient's scalp and hair;
- describes clinically significant behavior;
- documents sedation used, dosage, and effects (if applicable); and
- reviews EEG for appropriate documentation of amplifier settings & montage changes.

The technologist understands (has a working knowledge of):

- functional neuroanatomy and neurophysiology;
- medication effects on the EEG background and waveforms;
- medical terminology and accepted abbreviations;
- signs, symptoms, and EEG correlates for adult neurological disorders;
- signs, symptoms, and EEG correlates for pediatric neurological disorders;
- seizure manifestations, classifications, and EEG correlates; and
- psychiatric and psychological disorders and EEG correlates.

The technologist maintains and improves knowledge and skills by:

- reviewing EEG tracings with EEGer on a regular basis;
- reading journal articles;
- studying text books related to the field; and
- attending continuing education courses in electroneurodiagnostics.

The EEG technologist applies the principles of electronics and mathematics to recording by:

- knowing how differential amplifiers work;
- computing voltage and frequency of waveforms;
- calculating the duration of waveforms;
- understanding the polarity of the waveforms;
- understanding impedance; and
- understanding analog to digital conversion.

The technologist knows how waveform displays are affected by:

- 60 Hertz filter;
- filter settings;
- sensitivity settings;
- paper speed;
- referential and bipolar montages;
- digital filters;
- electrode types and electrode material composition; and
- malfunctioning equipment.

The technologist recognizes:

- normal and normal variant awake and asleep patterns for each age range;
- abnormal awake and asleep patterns for each age range;
- EEG patterns for levels of consciousness; and
- clinical seizure patterns.

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