

**TECHNICAL STANDARDS COMMITTEE 2010-2011**

**STANDARD THREE:**

**MINIMAL TECHNICAL STANDARDS CLINICAL  
ELECTROENCEPHALOGRAPHY:  
ROUTINE NEONATES AND YOUNG INFANTS  
(UP TO 8 WEEKS POST-TERM)**

**INTRODUCTION:**

Recording the neonatal EEG poses unique challenges. The technologist is required to modify routine set-up procedures and recording practices. The special requirements for neonatal recording follow and are to be used in conjunction with Standard One, "*Minimal Technical Standards Clinical Electroencephalography: Routine Adult*". (The recommendation numbers in this document correspond with those in the routine adult standards.)

**A) EQUIPMENT**

**2.0 ELECTRODES:**

- 2.1 The use of disk electrodes for recording the EEG in neonates is recommended.
- 2.2 Subdermal electrodes must not be used to record the EEG in neonates.

**B) TEST PREPARATION**

**1.0 DOCUMENTATION/PATIENT PREPARATION:**

- 1.1 The technologist should advise nursing staff and/or caregivers of the expected length of the EEG procedure in order to facilitate scheduling and ensure the necessary level of care.
- 1.2 Neonates and young infants should be comfortable and if feasible, fed prior to or during recording in order to encourage sleep.

**2.0 ELECTRODE PLACEMENT APPLICATION/REMOVAL:**

- 2.1 A reduced array of electrodes is required when the neonate's head circumference is less than 36 centimeters (cm). Either of two systems of head measurement is acceptable:

- 2.1.1 the International 10-20 System of Electrode Placement using the following sites: Fp1, Fp2, C3, C4, T3, T4, O1, O2, Fz, Cz, Pz, A1 and A2 (or mastoids, M1/M2).
- 2.1.2 the 12.5 – 25 System of Electrode Placement as proposed by the International Federation of Societies for Electroencephalography and Clinical Neurophysiology (IFSECN). It maps 12 equally-distributed electrode positions over the scalp.
- 2.2 Handling of the neonate should be minimal. Abrasion of the skin should be avoided.
- 2.3 Ether-based products such as collodion must not be used for electrode application. Accumulation of fumes in isolettes/incubators due to poor ventilation is noxious.
- 2.4 Wrapping the neonate's head with gauze or a conforming bandage to further secure the electrodes, is recommended. Compliance with institutional/laboratory entanglement policy is essential.

## **C) RECORDING PROCEDURE**

### **1.0 DOCUMENTATION:**

- 1.1 In addition to patient identification and clinical history (including the Apgar score), the following must be documented:
- gestational age;
  - conceptional age (gestational age plus chronological age);
  - medications and drug levels;
  - body temperature;
  - cephalic asymmetries; and
  - current clinical status.

### **3.0 IMPEDANCES:**

- 3.1 In the neonate, electrode impedances should be balanced and between 100 - 10,000 ohms. Acceptable values exceeding those recommended for adults eliminate the need for excessive skin abrasion and handling.

### **4.0 MONTAGES:**

**4.1** A single, standardized montage should be used throughout the neonatal recording. When necessary, additional montages should be used to enhance localization and signal appreciation.

**5.0 ANNOTATIONS:**

**5.1** Frequent annotation of patient and environmental changes is crucial for the accurate interpretation of neonatal EEGs. Head, eye and limb movement, lip-smacking and smiling should be clearly indicated as well as changes in state.

**7.0 FILTER SETTINGS:**

**7.1** Low frequency (high-pass) filter settings should be 0.3 Hz or 0.5 Hz to accurately display low frequency signals.

**8.0 TIME BASE/SWEEP SPEED:**

**8.1** A time base/sweep speed of 15 mm/sec is recommended.

**9.0 LENGTH OF RECORDING:**

**9.1** A minimum of 30 minutes of artefact-free, neonatal recording is recommended.

**9.2** Obtaining both active and quiet sleep cycles is preferred which may lengthen the recording time. Minimally, capturing an entire episode of quiet sleep is recommended.

**10.0 RESPONSE TESTING:**

**10.1** Response testing in stuporous or comatose neonates or those with an invariable EEG pattern should be performed toward the end of the recording.

**11.0 EXTRA-CEREBRAL MONITORING:**

**11.1** In addition to the adult standard requiring recording of the electrocardiogram (EKG) and electro-oculogram (EOG), the following should be monitored if feasible and when clinically indicated:

- respiration;
- the submental electromyogram (EMG); and
- upper and lower airways (in suspected apnea).

**12.0 VIDEO MONITORING:**

**12.0** If available, simultaneous, video monitoring of the neonate is recommended.

**D) ACTIVATION**

**2.0 PHOTIC STIMULATION:**

**2.1** In neonatal recording, photic stimulation is clinically useful *only* in the instance of myoclonic seizures (*see “Guidelines for Visual-Sensitive EEG Testing”, 2008*). Otherwise, it is not recommended.

**6.0 SEDATION:**

**6.1** Spontaneous sleep is preferred for neonatal assessments. The use of sedation is rarely indicated and is not recommended.

**F) SAFETY**

**2.0 PATIENT-CENTERED CARE:**

**2.1** Prior to recording, the technologist should confer with the attending staff or caregiver to determine the neonate’s clinical condition. Recording restrictions or procedure modifications to accommodate special needs must be documented.

**2.2** Appropriate medical staff should be alerted to any changes in the neonate’s clinical presentation.

**H) TECHNOLOGIST QUALIFICATIONS:**

**1.0 SPECIAL REQUIREMENTS:**

**1.0** Neonatal EEGs should be recorded by or acquired under the direct supervision of a Registered Electroneurophysiology Technologist (RET) who has expertise in these specialized studies.