

POLICIES & PROCEDURES**SLEEP RESEARCH LAB**

Date: _____

Approved: _____

ELECTRODE AND MONITOR PLACEMENT FOR NPSG AND MSLT

Measurement and location of EEG electrodes are based on the International 10-20 System of Electrode Placement. See attachment.

- I. Electrode application procedures.
 - A. All electrode sites are first prepped with Nuprep on a cotton swab. Nuprep should be wiped away with alcohol when used on bare skin to ensure proper adhesion.
 - B. Electrodes on the scalp are applied by placing Elefix under the disc of the electrode and placing on the site, pushing down to spread the paste. Apply EC2 cream over the top of the disc and cover with a gauze square. Again push down lightly to spread the paste. The EC2 cream will harden in about 15-30 minutes. Applying air to the electrode will shorten the drying time. Place Cover-Roll tape over reference electrodes on the mastoid bone to ensure adhesion.
 - C. Bio-potential electrodes are used on the face and applied with an electrode collar. Remove the white tab from the electrode collar and apply electrode gel with a syringe and stub adapter to the metal part of the electrode. Very little gel is needed. Position the electrode in place. Cover electrode with Cover-Roll tape.
 - D. ECG and Leg electrodes are snap leads and used with self-adhesive, pre-gelled Huggables snap electrodes. Prep the skin vigorously with Nuprep, wipe with alcohol, and position electrode in place. Cover each electrode with Transpore or Micropore tape. On men use Co-Flex tape instead of Transpore over leg electrodes to prevent hair pulling when removing.
 - E. Check electrode impedance by plugging in the electrodes into the jackbox and the jackbox into the impedance meter. Check that the k ohm setting is at 5. Depress each electrode site. A red light indicates that the impedance is over 5 k ohms, and the electrode site should be re-prepped and the electrode reapplied or replaced. Electrodes for recording EMG signals can be over 10 k ohms and still produce an artifact-free signal.

II. NPSG Electrode Placement

A. EOG (electrooculogram)

1. Left eye (L EOG) – Place electrode 2 cm to the left and 2 cm down from the outer canthus of the left eye.
2. Right eye (R EOG) – Place electrode 2 cm to the right and 2 cm up from the outer canthus of the right eye.

B. EEG (electroencephalogram)

1. Ground electrode is placed at CZ.
2. Central electrodes are placed at C3 and C4
3. Occipital electrodes are placed at O1 and O2
4. Reference electrodes, A1 and A2, are applied to the mastoid bone behind each ear.

C. EMG (electromyogram)

1. Place an EMG electrode on the submental muscle under the chin and one EMG electrode on each side of the face over the mandibular muscle. Ask the volunteer to clench his/her teeth and feel where the muscle is flexed.
2. A pair of leg electrodes are placed over the anterior tibialis of each leg. To find the correct position, have the volunteer flex his/her big toe and feel for the flexion.

D. ECG (electrocardiogram)

1. Place a pair of electrodes, one on each side of the body on a flat surface right below the notch of the collarbone.

E. Monitors and sensors

1. Respitrace

Place band around chest and one around the abdomen with velcro closure in front. Tape down bands to sleepwear using Micropore tape. Chest band is plugged into white wires of transducer cable, abdomen is plugged into black wires. Oscillator is taped to the chest band.

2. Snore mic

Snore mic is taped at a point below the microphone to the volunteer's forehead. It also can be placed near the trachea with the amplifier gain turned down.

3. Body position sensor

The body position sensor is taped to the oscillator or on the chest band on a flat surface of the center of the body. The arrow on the sensor should point up to the head.

4. Airflow and nasal pressure

Use the Dymedix disposable airflow sensors on all volunteers except those men with mustaches or those using CPAP. Wire ends of sensor are plugged into the adapter cable which plugs into the jackbox.

For CPAP users, use the SleepMate flat sensor with adapter cable.

For men with mustaches, use the Pro-Tech reusable 2-channel airflow sensor.

Use a nasal cannula for the Pro-Tech nasal pressure transducer (except for CPAP wearers), placing it over the top of the airflow sensor. Tape cable wires to face left and right of nose.

5. Oximeter

Attach oximeter probe to middle or ring finger, placing red light over the nail bed. Secure probe with Co-Flex tape using several layers to obscure the light. Pinch the top to seal the tape. Tape the cable wire using a slack loop to the back of the wrist.

III. MSLT Electrode Placement

The electrodes used for MSLT include EOG, EEG, EMG and ECG. Follow the same instructions for NPSG electrode placement.