MEG Setup Procedures

Revised 01/2022

These instructions assume you have completed your MEG Core Orientation and Safety Training and have been properly instructed in use of the equipment.

Head Size / Fit Test

If the participant's head size is a concern, fit can be determined by placing the mock helmet along with a protective cap over the subject's head, or measuring the subject's head with a tape measure and referencing the chart below.

MEG Helmet Limits:		
Nasion to Inion Distance	**Preauricular Distance**	**Circumference**
≤ 40cm	≤ 40cm (approx.)	≤ 60cm

Fiducial Points/Head Coil Placements

**For repeat scans: If subject has had a previous MEG scan, you can match the fiducial placement either with digital pictures of the fiducial points, or with the .bsproj file, if you recorded the locations with Brainsight.*

1) Place a small black dot 1.5cm from the nasion (indentation between the forehead and the bridge of the nose) midline.
2) Place a small black dot 1.5cm from the left & right preauricular points (on a line from the tragus to the outer canthus of the eye).
3) If performing coregistration with Brainsight, complete the Brainsight procedure and then proceed to Step 4. Otherwise, take a picture of these locations using the digital camera. You can download and print pictures for your record from the computer provided in the lab.
4) Attach adhesive washers to head localization coils.
5) Attach head localization coils to subject at the marked points
   - Nasion –Blue
   - Right Ear – Red
   - Left Ear – Green

   **The lead colors may change based on equipment availability. Check in with MEG Core staff if you are unsure.*
6) Secure with Transpore (medical) tape.
7) Proceed to setting up the participant in the MSR.

Chair Adjustments

The chair is a pneumatic-hydraulic unit and sometimes there may be a 2-3 second delay when operating the controls.

***Never operate the gantry while a subject's head is in the helmet.** Care should be taken when adjusting the chair with a subject seated. Until familiar with the operation of the chair, adjust very slowly in small increments.*

1) Front Panel Controls

a) There are two valves (Height Adjust Valve and Tilt Adjust Valve) and a hand wheel (Motion Control Hand wheel) located on the front control panel. The Brake Valve is located on the side of the control panel. Using these controls there are three adjustments that can be made:

- The chair can be raised up or down (Height Adjust Valve),
- The backrest can be raised or lowered (Tilt Adjust Valve) and
- The chair can slide back or forward (Brake Valve).

b) The Height Adjust and Tilt Adjust Valves located on the front control panel controls whether the hand wheel adjusts the height of the chair or the tilt of the backrest. <u>The two valves cannot be activated at the same time.</u>

2) Chair Backrest Adjustment

a) The upper valve controls the TILT of the chair backrest.
b) To adjust the back rest turn the valve to the "1" (on) position.
c) With the Tilt Valve in the "1" position the hand wheel controls the backrest angle. The hand wheel is turned clockwise to make the backrest move up and is turned counter-clockwise for downward motions.
d) The Tilt Control Valve should always be left in the "0" (off) position unless adjustments are being made.

3) Chair Height Adjustment

a) The lower valve controls the HEIGHT of the chair.
b) To adjust the height of the chair turn the valve to the "1" (on) position.
c) With the Height Adjust Valve in the "1" position the hand wheel controls the speed and direction of movement of the chair height. The hand wheel is turned clockwise to make the chair move up and is turned counter-clockwise for downward motions.
d) The Height Adjust Valve should always be left in the "0" (off) position unless adjustments are being made.

4) Chair Movement

a) The BRAKE valve controls the back and forward movement of the chair.
b) Turn the valve to the "1" (unlocked/on) position.
c) With assistance, push the chair back or forward to position the chair so that the subject's head is directly under the gantry.
d) The brake provides only a light braking effect. While it is possible to move the chair with the brake in the "locked" position this should be avoided as it will cause premature wear to the brake pad.
e) After adjusting the chair set the brake to the LOCKED ("0") position.

<u>Positioning a Subject in the Chair</u>

***Never operate the gantry while a subject's head is in the helmet.**

1) The gantry should be at 15° tilt (fully upright) in the seated position.
2) Ensure the visual stimulus screen is locked in place before placing a subject in the chair.
3) Guide the subject into the chair, reminding them to be mindful of the MEG helmet as they sit down.
4) If using auditory stimuli, prepare the auditory tubes with a disposable earbud (yellow). Instruct the participant to insert the earbud like an earplug and allow it to fully expand in the ear canal. Shallow insertion will cause sound attenuation (as much as 30dB lost) and will affect the results of your study.
5) Prepare the Pearltec head positioning pads with a disposable cover for each pad and give to the participant. Instruct the participant to hold the pads over their ears as they are raised into the Dewar.
6) Care should be exercised when adjusting the chair height while a subject is seated under the gantry. The operator should be completely familiar with the operation of the controls before operating the chair with a subject or patient's head inside the gantry.
7) Adjust the chair very slowly in small increments. Adjust the chair height so that the subject's head is near the top of the gantry. Query the subject with each adjustment.
8) Place the triangular leg pillow under subject's knees and so that the subject does not slide down in the chair. Instruct the participant to inflate the Pearltec pads to a comfortable
9) If it is anticipated the subject will be required to keep head / neck still for extended periods of time, you can add rolled up towels to bolster the neck or additional Pearltec pads to fill in helmet space at the back of the head to stabilize your participant.

<u>Gantry Position</u> – Tilting the Gantry

***Never operate the gantry while a subject's head is in the helmet.**
***Before lowering the gantry, ensure that there is nothing resting on the flat surface behind the MEG Dewar. Equipment has been crushed and destroyed when the gantry was lowered.**

1) The gantry has an indicator and several controls which are located on the right side of the base. These include:

- **Brake Lever** - (lower handle) releases the brakes.
- **Tilt Control Lever** -(upper handle) controls the UP/DOWN movement of the gantry.
- **Angle Indicator** – indicates the gantry's angle of tilt.

<u>The controls have been designed so that the operator is required to use both hands.</u>

3) Pulling up on the Brake Lever turns on the power and releases the brake. Releasing the Brake Lever turns off the power.
4) The Tilt Control Lever is OFF when in the center position.
5) To re-position the Gantry, lift the Brake Lever.
6) If the gantry brake does not release immediately when the Brake Lever is raised, raise the gantry up a few degrees before starting downward motion.
7) As the Tilt Control Lever handle is lifted further the gantry will begin to rise.
8) Pushing the Tilt Control Lever handle down will cause the gantry to lower.
9) Returning the Tilt Control Lever to the center OFF position will cause the

gantry motion to slow to a stop.

*If you hear grinding or scraping, or notice anything unusual when operating the gantry controls, STOP and ask MEG Core Staff for assistance.

Positioning a Subject on the Bed

***Never operate the gantry while a subject's head is in the helmet.**

1) Gantry should first be lowered to the 90° position.
2) Remove the armrest cushions from the chair.
3) Raise the chair to the highest level.
4) Fully recline the chair backrest. Make sure that the chair controls are locked in position. The bed can now be mounted onto the chair.
5) Using two people, lift the bed by the ends. Hand grips have been mounted to the under side of the bed to assist with this operation.
6) Set the bed onto the (unpadded) armrests of the chair.
7) Four mounting bolts are tied to the base of the bed. Insert them through the holes in the bed base into the holes in the chair armrests. All four bolts should be screwed in a couple of turns and then fully tightened when all four are engaged.
8) If the head end cushion will have its angle adjusted, the cushion lock bolts should be removed from their locked position and stored in the holes I the blocks to which they are tied.
9) Install bed side rail on one side. At least one side rail must be in place before allowing a subject to get onto the bed. Tighten rail clamp to secure.
10) Place the step stool on the opposite side to assist the subject in getting onto the bed.
11) Once the subject is on the bed place the side rail on the remaining side. Tighten rail clamp to secure.

Subject Monitoring Inside the MSR

1) **Never leave a subject unattended in the MSR.**
2) The operator can converse with and monitor the activities of the subject inside the MSR by:
    a) voice intercom,
    b) video cameras,
    c) a video display near the operator console
3) To listen to activity inside the MSR, turn on the Intercom System. There are no intercom controls inside the MSR, just a parabolic microphone and flat speaker.
4) To speak to a subject who is inside the MSR, press the button located on the front of the Intercom Electronics Box.
5) The operator can adjust the volume in the MSR or at the Console by using the knobs located on the front of the intercom electronics box.

References:

MEG/EEG Operation and Technical Reference Manuals, CTF Systems Inc.