EMG Electrode Application

Step 1: Take one adhesive electrode washer from sheet and apply it to head of electrode. Make sure it is centered so the hole on the washer lines up with the cavity of the electrode.

Step 2: Fill the electrode cavity with conductive gel from syringe. Make sure there are no air bubbles trapped under the gel. A bubble can prevent the equipment from capturing cohesive and accurate muscle activity data.

NOTE: If you are using the smaller electrodes (commonly used for the face muscles) you will need to trim the electrode washers like in the picture below, so they will fit on the electrodes.

Then stick them on as shown below:
Step 3: Take a cotton ball and wet it with rubbing alcohol.

Step 4: Clean the participant’s skin where the electrode will be placed. Use the cotton ball to slightly abrade the surface of the skin until it is a light red color. Do not scrub it too hard, but enough to turn it slightly red.
Step 5: Locate the desired muscle on the participant. To find EMG electrode placement, look in reference texts.

NOTE: A good trick is to use a rubber band to help identify lengths in ratios. You can mark the rubber band at fractions of lengths. Then when it is extended, the markings will help you identify exact locations along the muscles.

For Example: If the electrodes should be placed half way between two points. Mark the halfway point of the rubber band at resting length. When rubber band is extended between two points, the half way point will be located where the marking on the rubber band is.

Step 6. Mark the specified location with a felt tipped non-permanent marker on the participant’s skin. You may need someone else to help you mark the skin while you are holding the rubber band.

Step 7: Palpate the muscle to make sure you have located the right spot for the electrode placement. To do this, apply your fingers to the prospective location of the electrodes. Ask the participant to flex and relax the muscle while you feel the muscle. You may need to provide some resistance for the participant, as shown by the experimenter holding the persons fist in the picture below. You are looking for a difference in hardness from when the muscle is flexed to when it is relaxed. You should be able to feel the muscle harden during the contraction. Move your fingers around if you do not feel a difference until you think you have accurately located the muscle.
Step 8: Remove the paper backing from the electrode washers and apply the electrodes. They should be placed along the length of the muscle. The electrodes should be far enough apart so the electrode washers are just barely touching.

NOTE: When applying the electrodes, try to orient them so the wires flow in a convenient direction so you can tape and secure it appropriately.

Step 9: Place 3M tape closely over the electrodes to provide support and extra adhesive so the electrodes are secure.

NOTE: Making a cross pattern with the tape helps to keep the electrodes statiscally located on the skin.
Step 10: Tape the wires to the participant’s body or clothing to ensure that the wires are not flapping around and that the electrodes are secure.

Step 11: Ask the participant if they can freely move their arm or body parts. Make sure they can easily bend their joints where the wires are attached. Get them to extend and flex their joints to make sure they are not restricted or are pulling on the electrode wires. Make sure the electrodes stay static while the participant is moving. This is very important because this can affect the consistency of your EMG signal. If you are getting random spikes in the signal, make sure the wires are properly secured.

Step 12: Ask the participant if they are comfortable.
Step 13: Make sure to apply the single electrode to the elbow of the participant. This provides a ground for the system.

Step 14: Evaluate the participant to estimate which belt they need, depending on their waist circumference. Plug the 9V battery into the EMG belt unit. Secure the battery and belt unit to the chosen belt by closing the small Velcro flaps.

Step 15: Attach the EMG belt unit to the participant by wrapping the belt around them and attaching the velcro.

NOTE: Run the EMG cables through the belt to help secure them so they do not hang down too much.

Step 16: Plug in the electrodes to the belt unit’s cables corresponding to the channel you are using. Each cable is labeled with a channel number. Tape the wires around the connection so they are secure. The cables are numbered differently in the QuickDAQ Software channels. For example, cables 1 and 3 correspond to channels 0 and 2 on the software channels.
Step 17: Secure cables with tape.

The system attached should look similar to the following pictures.

Turn on EMG belt unit by flipping the switch at the bottom. Also turn on the decoder by flipping the switch. There should be three green lights. If something is wrong, one of the lights will be red. Make sure the battery in the EMG belt unit is not dead.

Removing EMG equipment and electrodes
Step 18: Remove tape, and disconnect electrodes.
Step 19: Remove belt unit from participant.

Step 20: Remove electrodes from the participant.

NOTE: Be careful when removing the electrodes from the skin. Do not pull on the wire, because this could damage the electrodes. Pull on the blue tab on the washer.
Step 21: Clean the gel off of the participant’s skin.

Step 22: Clean the electrodes. Remove the washers and clean out the gel with a Q-tip. Do not use alcohol to clean the electrode.