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10/12/23  
Bio 125  
Physiology  
Lab #9-D

### Demo of Electromyograph (EMG)

#### **Purpose:**

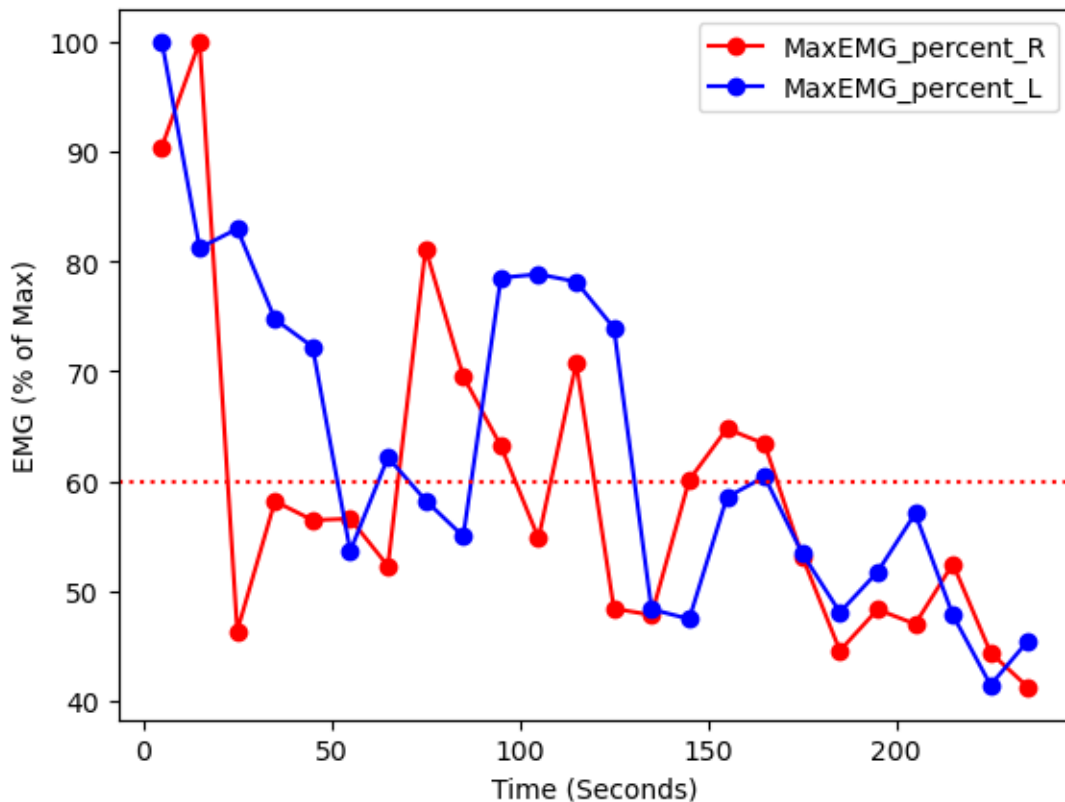
In today's lab we will show the impression of agonist, antagonist and synergist muscles. The prime mover is agonist, which is the primarily responsible for given movement. Antagonist muscle works in opposition to the agonist. While synergist will aid the agonist and help refine a given movement.

#### **Procedure:**

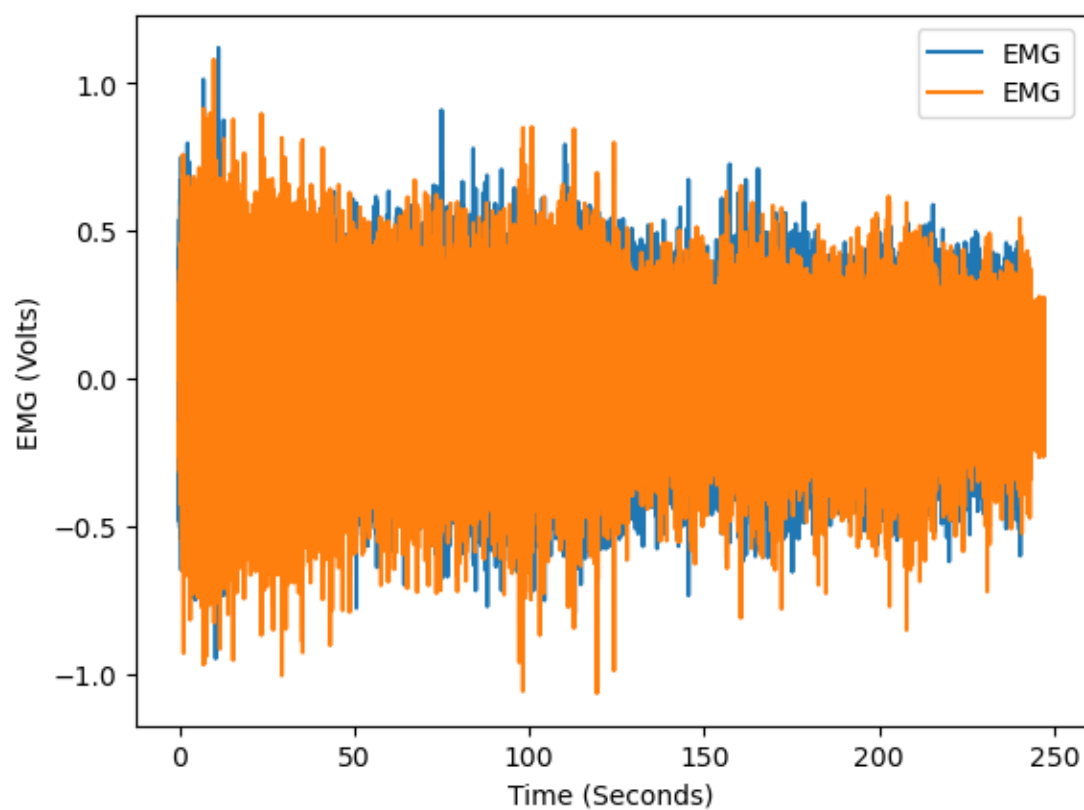
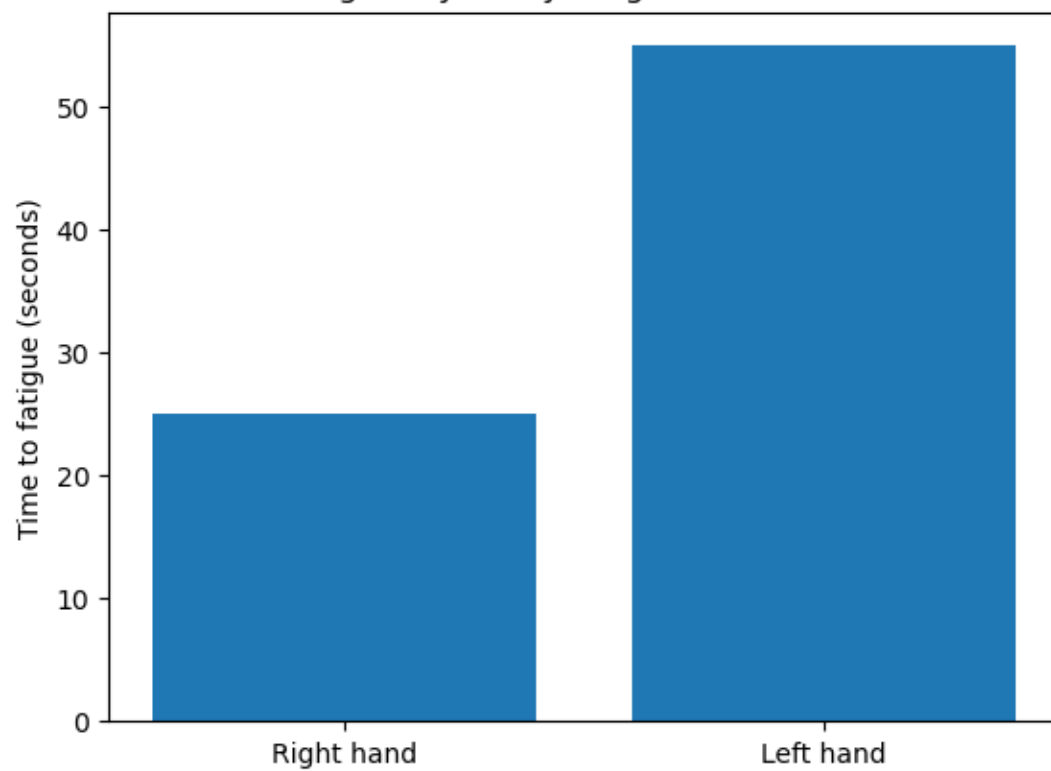
1. To get things started:
    - Before you turn anything on, be sure the IWX/214 unit is plugged in, and that the IWX/214 unit is connected to the laptop by USB cable.
    - Be sure that the C-AAMI-504 EEG cable is inserted into the isolated inputs of Channels 1 and 2 of the IWX/214. Be sure that the color-coded lead wires are correctly inserted in the lead pedestal of the C-AAMI-504 EEG cable. Insert the connectors on the electrode lead wires into the color-coded matching sockets on the lead pedestal of the ECG cable.
    - Once everything is connected, FIRST turn on the laptop and allow it to fully boot up before you turn on the IWX/214 unit. Once the Iworx unit is on, the red indicator light on the Iworx unit should light up and you may hear the USB chime from the laptop if the laptop does not default to mute (many are set to default to mute).
  2. Open the Labscribe3 program by clicking on the Labscribe3 icon on the desktop. As soon as the program opens, you should see a window pop-up that says, "Hardware found IWX214:2008-1-24," click "OK."
  3. In the second from the top row (the row that says, "File Edit View Tools Settings Advanced External Devices Help"), click on the "Settings" tab. About halfway down the drop-down window should be a tab called "Human Muscle." Click on that tab and that should lead you to another drop-down list with the second tab from the top called "Antagonistic Muscle," click on that tab and close the pdf file that appears, you don't need it.
  4. Instruct the subject to remove all jewelry from his/her arm and wrist. Use an alcohol swab to clean the regions of skin on the forearm you are going to use (Fig. 9-1). Let the area dry. Remove a disposable electrode from its plastic shield and apply the electrode to the six locations.
  5. Place the electrodes from proximal to distal on the forearm in the following order: +2, -2 on the posterior and +1, -1 and ground on the anterior. (Fig. 9-1.) Snap the lead wires onto the electrodes as follows:
    - the red "+1" lead is attached to the proximal electrode on the anterior surface.
    - the black "-1" lead is attached to the distal electrode on the anterior forearm.
    - the green "C" lead (the ground) is attached to the remaining electrode on the anterior surface.
    - the white "+2" lead is attached to the proximal electrode on the posterior forearm.
    - the brown "-2" lead is attached to the distal electrode on the posterior surface. The experimental set-up should look like the illustration in Fig. 9-2.
- Fig. 9-1: Electrode placement Fig. 9-2: Experimental set-up.

6. Record an EMG of the muscles of the forearm illustrating agonistic and antagonistic muscle activity for each of the exercises described below. Type the student's name and the appropriate letter for the activity (A, B, C, D—see below) in the Mark box to the the right of the Mark button. Click their "Rec" button to begin the recording; then, press the Enter key on the keyboard to mark the beginning of each the activity. The recording for exercise "A" should look like Fig. 9-3. If you do not see anything, try clicking on the Auto Scale tab and/or checking the electrode contacts. Repeat these procedures for each of the remaining activities.

### Results:



Fatigability Assay - Right vs Left Hand



**Discussion:**

It seems to be that the left hand took the longest to reach fatigue vs the right hand. Data shows that the right hand takes 24.9995 seconds and left hand 54.9995 seconds to reach fatigue.

**Conclusion:**

Fatigue time varies person to person so our synergist will always be different because our agonist and antagonist are common. Our agonist muscles are responsible for being our prime movers, these muscles contract to provide the main force behind the ability to move our bones in the joints. Overall muscles that are contracting are agonist in nature. While muscles that are relaxing and increasing in length are antagonist in nature.