

Title: Lab 9- Muscle physiology

Purpose:

The purpose of this lab is to investigate the different contractions characteristics of skeletal, cardiac, and smooth muscle. Also we will learn the different effects of neurotransmitters, acetylcholine, and norepinephrine and the rate of the contractions of the cardiac and smooth muscle will be examined. We will also be recording an electromyogram (EMG) and the different effect of oxygen availability in the muscle.

Procedure

9-D

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 half way 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 a ready. 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 main electrode on the anterior surface.
 - The white "+2" lead is attached to the proximal electrode on the anterior surface.

posterior forearm. • the brown “-2” lead is attached to the distal electrode on the posterior surface.

9-E

1. Firmly squeeze a tennis ball as rapidly as possible with your non-dominant hand until you feel fatigued can no longer squeeze it. Record the duration of this effort.
2. Have a partner attach a sphygmomanometer cuff to your dominant arm and inflate it to 150 mmHg, or 10 mmHg above your normal systolic pressure, if you know your blood pressure values.
3. Repeat the squeezing exercise with your dominant arm. Record the time duration of this effort. (NOTE: it is important to stop at the same sensation of fatigue, or “burn,” as then on-dominant arm.)
4. Evaluate the differences between the two duration measurements obtained in terms of energy demands of skeletal muscle and fatigue.

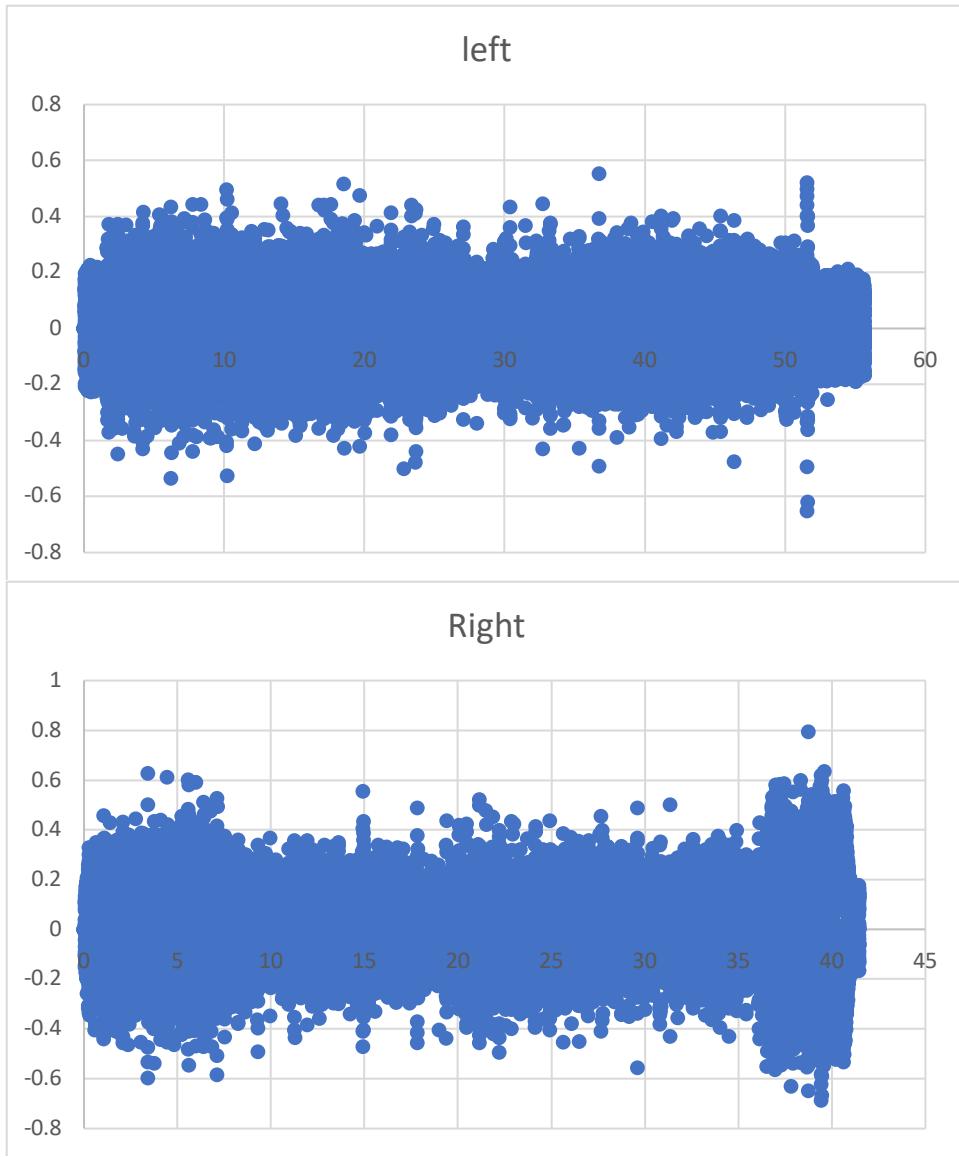
Results

9-D

EMG 0
0
0.226675 0.146403 -0.0745588 -0.186767 -
0.130635 0.0606579 0.254987 0.0810203 -
0.157612 -0.178331 -0.0151714 0.14045 0.149315
0.00788003 -0.217784 -0.146497 0.132439...



9-E



Discussion

9-D

The motor recruitments increased over time during these assignments.

9-E

The motor recruitment decreased over time.

Conclusion

In conclusion, we were able to see how it looks when a muscle contracts. While we were doing the exercises we were able to see that when at first the contractions were stronger and they went down as we kept doing them. When pushing up on someone's arm we were able to be bigger contractions than squeezing a tennis ball. We were also able to distinguish a partial contracted muscle vs a fully contracted muscle.