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Lab 9- Muscle Physiology
10/17/2023

Purpose: The purpose of this experiment was to investigate the different contraction characteristics of skeletal, cardiac, and smooth muscle. We used an EMG to record the physical contractions of the entire muscle so we can get to see the difference between the measurements and compare.

Procedure:

9-D) Demonstration of the electromyograph (EMG)

1. Be sure the IWX/214 unit is plugged in, and that the IWX/214 unit is connected to the laptop by USB cable. C-AAMI-504 EEG cable is inserted into the isolated inputs of Channels 1 and 2 of the IWX/214. 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 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.
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. Click on "Setting" tab. 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 "AntagonisticMuscle," click on that tab and the close the pdf file that appears, you don't need it.
4. Remove a disposable electrode from its plastic shield and apply the electrode to the six locations.
5. Place electrodes from proximal to distal on the forearm

* Red- proximal on anterior surface, black- distal on anterior forearm, green- anterior surface, white- posterior forearm, brown- posterior surface

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. Mark box to the right of the Mark button. Click the red "Rec" button to begin the recording; then, press the Enter key on the keyboard to mark the beginning of each the activity.
7. valuate the amplitude and frequency of the EMG recordings. Identify the agonists, antagonists, and synergists, if applicable, for each activity. For example, what muscles were the agonists during wrist flexion - anterior or posterior forear muscles? How did the EMG change for the antagonists when the wrist was more

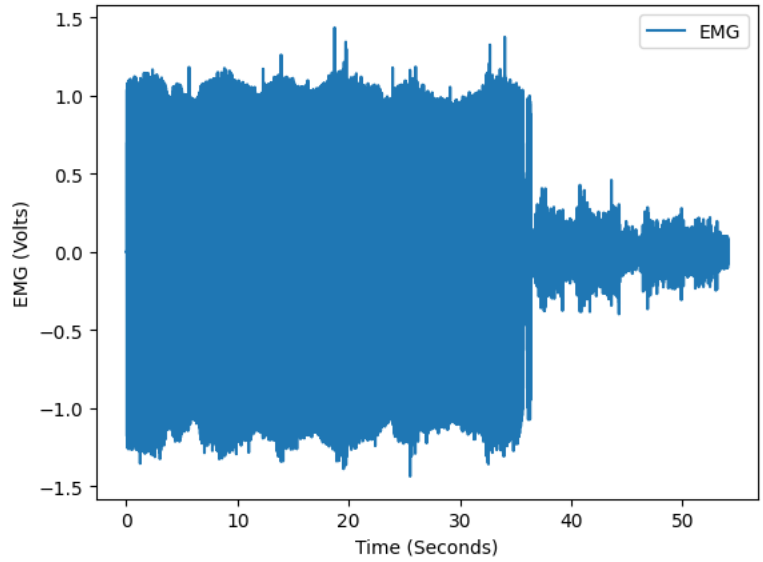
forcefully moved? During which exercise(s) did synergistic muscle activity become apparent?

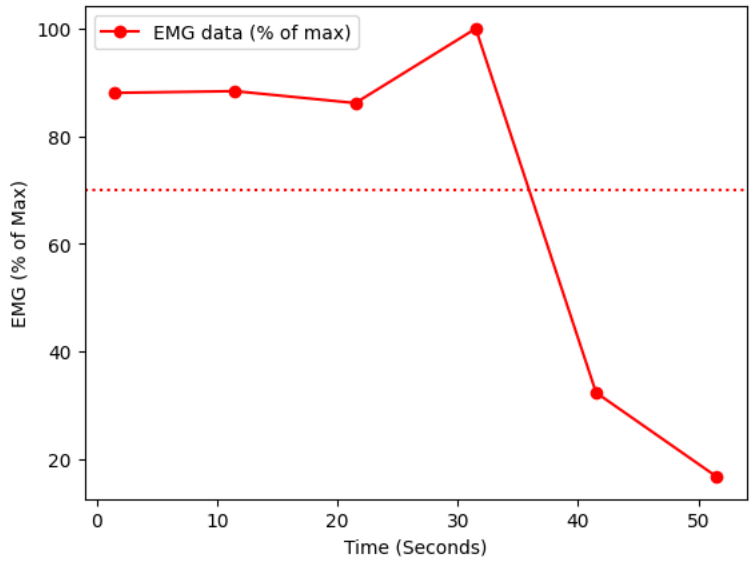
9-E) The effect of oxygen supply on skeletal muscle activity

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 the non-dominant arm.)
4. Evaluate the differences between the two duration measurements obtained in terms of energy demands of skeletal muscle and fatigue.

Results:

9D-




EMG data (% of max)
EMG (% of Max)
Time (Seconds)
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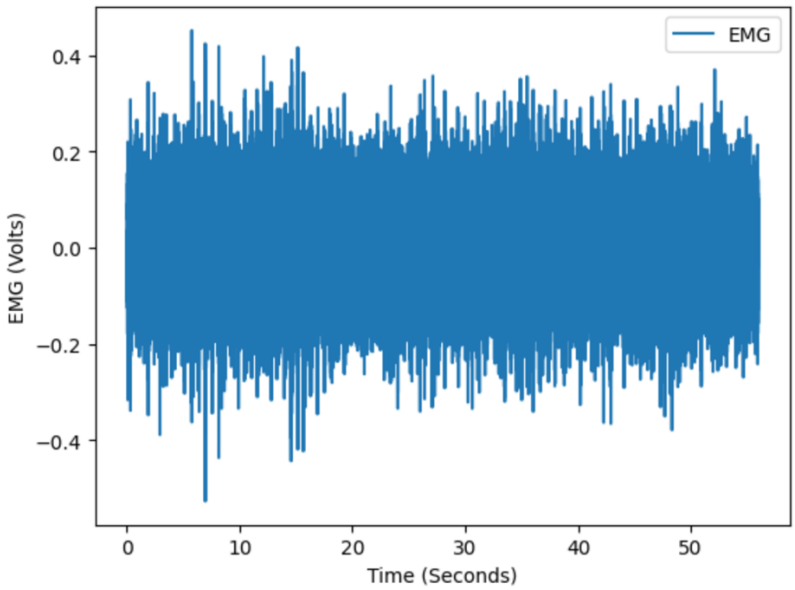
80
60
40
20
0
10
20
30
40
50

9E-


EMG
EMG (Volts)
Time (Seconds)
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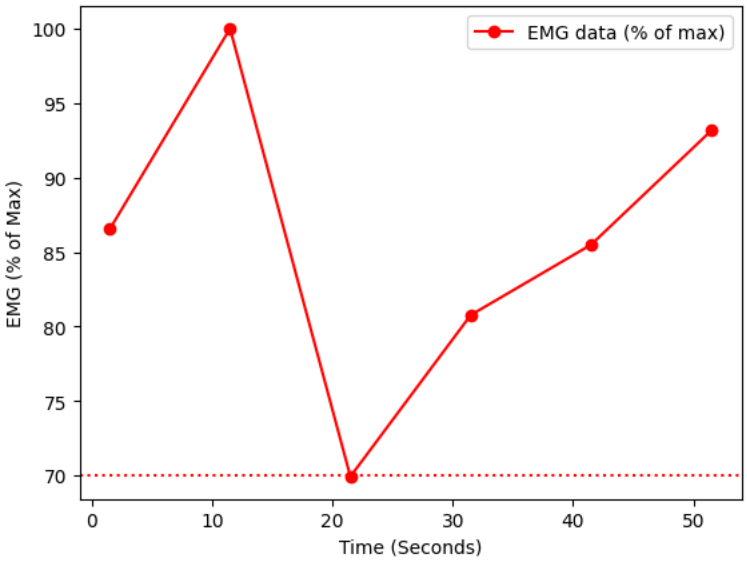
0.0
−0.2
−0.4
0
10
20
30
40
50



Discussion: This lab took me a while to do since were figuring out how to use the EMG machine and getting a good reading was giving my partners and I a little while to figure out. After getting that settled, we each did our part. I'm not a fan of this since it involved so many things to just be able to save the numbers.

Conclusion: After being done with lab I was glad. Although it did take me a while to complete the whole assignment. I kept trying to finish but kept doing little by little. Now that I'm done, I feel relieved to have completed it all.