Frank Howard

Data Collection Test Plan

Objective: To collect EMG and motion data from various patients over 18 years of age, having either an essential tremor or not.

Materials:

- Computer
- Senior design DAQ device
- PowerLab 26
- Alcohol Swabs
- Electrode Cream
- Gel electrodes
- Lead wire and connections
- Table
- Chair

Testing Setup

1. Software Setup
    a. Run the executable application “P19043”
    b. Connect the data acquisition device to the computer (Wired or Bluetooth)
    c. Go to “Device Manager” under “Ports (COM & LPT)” and see which COM port the “Arduino Mega 2560” is connected to
    d. Go under the “Edit” Tab of the P19043 application to “Set COM Port…” and select the correct Com Port
    e. Click the “Connect to Device” button to confirm the connection
    f. Click the “Start Recording” button to begin the data acquisition
    g. Stop recording by hitting the “Stop Recording” button or by disconnecting the device. The data will all be saved in a file called “all_values.csv”.
    h. If another sampling period is required, the “all_values.csv” file will have to be renamed, moved, or deleted.
2. Hardware Setup
    a. Attach the DAQ device with velcro straps to the test subject
        i. Ensure that the hand connection strap is secured, but not tight enough to restrict blood flow.
        ii. Ensure that the lower arm connection strap is secured , but not tight enough to restrict blood flow.
        iii. Ensure that the upper arm connection strap is secured, but not tight enough to restrict blood flow.
    b. Attach gel electrodes to the Myomuscle EMG sensors.
    c. Attach Myomuscle EMG sensors to the test subject.
        i. Have the test subject extend their wrist. See Appendix A for details.

1. The investigator will isolate the muscle group.
2. The investigator will clean area of skin with an alcohol swab.
3. The investigator will place Myomuscle EMG sensor **one** to the site.

ii. Have the test subject flex their wrist. See Appendix A for details.
1. The investigator will isolate the muscle group.
2. The investigator will clean area of skin with an alcohol swab.
3. The investigator will place Myomuscle EMG sensor **two** to the site.

iii. Have the test subject supinate their wrist. See Appendix A for details.
1. The investigator will isolate the muscle group.
2. The investigator will clean area of skin with an alcohol swab.
3. The investigator will place Myomuscle EMG sensor **three** to the site.

iv. Have the test subject pronate their wrist. See Appendix A for details.
1. The investigator will isolate the muscle group.
2. The investigator will clean area of skin with an alcohol swab.
3. The investigator will place Myomuscle EMG sensor **four** to the site.

d. Have the test subject sit down at a table with their arms resting on the tables surface **Figure 1**.

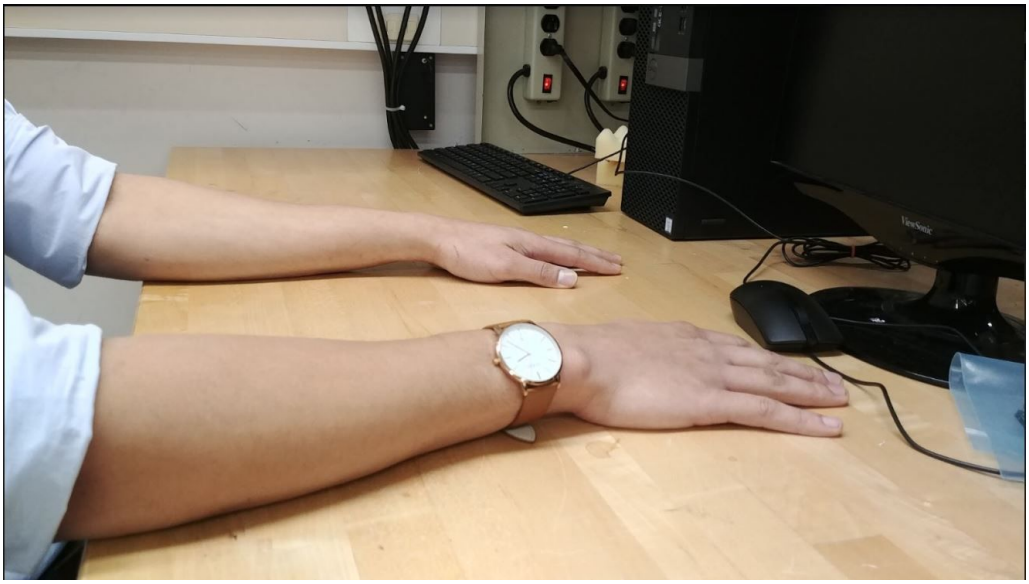


Figure 1: Test Subject with Resting Arms

i. The test subject should be sitting erect in the chair.
ii. Their arms should be resting comfortably, while ensuring that their arms are extended linearly from their sides.
iii. NOTE: This will be referred to as the baseline position.

e. Turn on the DAQ device and ensure the channels are picking up signal.
i. If the channels are not receiving a signal, repeat step 2C.

ii. If the channels are still not receiving signal, stop the test, remove the device, and set it aside for the investigator to review.

Test Protocol

1. Have the test subject raise their arm so that it is parallel with their shoulder **Figure 2**.

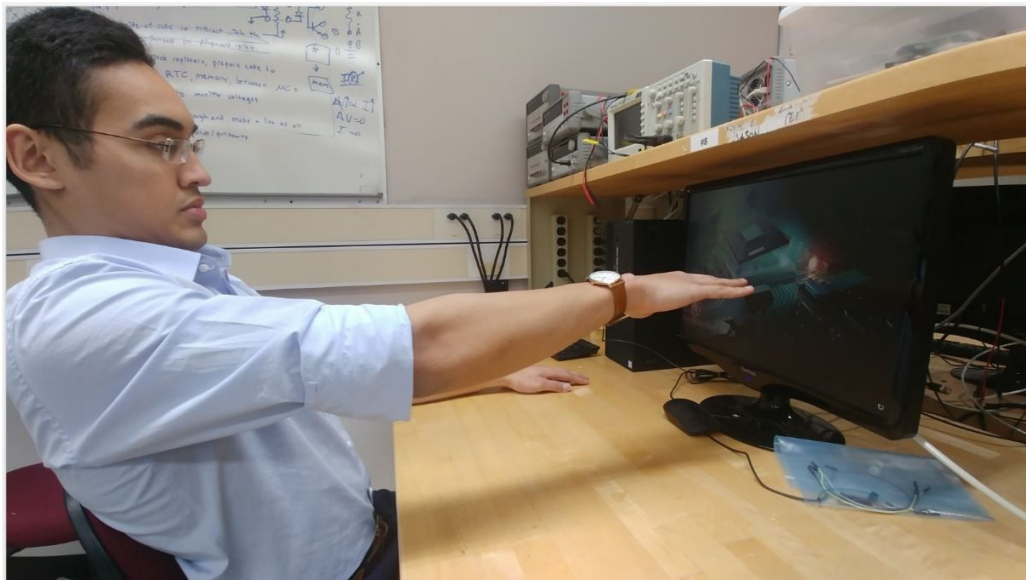
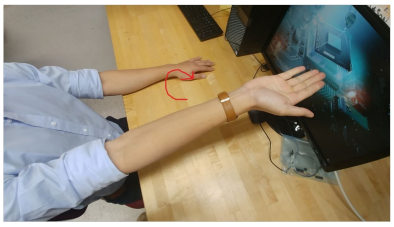
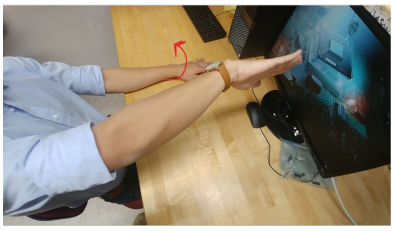
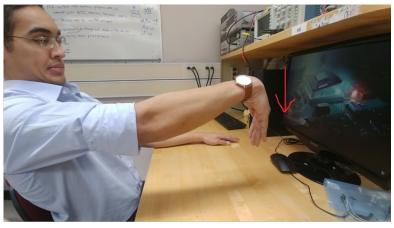


Figure 2: Test Subject with Raised Arm

   a. NOTE: This will be referred to as the initial testing position.
2. Have the test subject extend their wrist over the span of three seconds.
3. Have the test subject return to the initial testing position.
4. Have the test subject flex their wrist over the span of three seconds.
5. Have the test subject return to the initial testing position.
6. Have the test subject supinate their wrist over the span of three seconds.
7. Have the test subject return to the initial testing position.
8. Have the test subject pronate their wrist over the span of three seconds.
9. Have the test subject return to the initial testing position.
10. Have the test subject roll their wrist to the left over the span of three seconds.
11. Have the test subject return to the initial testing position.
12. Have the test subject roll their wrist to the right over the span of three seconds.
13. Have the test subject return to the initial testing position.
14. Have the test subject hold the initial testing position for 30 seconds to fatigue their arm.
15. After the 30 seconds concludes, let the test subject rest to try and remove a fatigued muscle state.
16. Repeat steps 1-15 in triplicate.

Appendix A:

Movement Name:	“Neutral Photo”	“Desired Movement Photo”
Supination		
Pronation		
Ulnar Deviation		
Radial Deviation		
Flexion		
Extension