L01 - Electromyography (EMG) I (4.1.2 Jan 11 2017)

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First recording (starts at event labelled 'Dominant arm'): Four clench-release-wait cycles; fourth clench is maximum force.

Second recording (starts at event labelled 'Non-dominant arm'): Four clench-release-wait cycles; fourth clench is maximum force.

L01 DATA REPORT

Student's Name: Michael Lenehan

Lab Section: L01

Date: 8/2/2019

I. Data and Calculations

Subject Profile

Name: Michael Lenehan   Height: 1.78m   Weight: 89.8kg

Gender: Male   Age: 22   Dominant arm: Right

Note: This Data Report assumes that all lesson recordings were performed, which may not be the case for your lab. Please disregard any references to excluded recordings.

A. EMG Measurements

Clench	Dominant arm	Nondominant arm
#1	Mean = 0.15136 mV-sec	Mean = 0.08836 mV-sec
#2	Mean = 0.19062 mV-sec	Mean = 0.15010 mV-sec
#3	Mean = 0.25095 mV-sec	Mean = 0.23751 mV-sec
#4	Mean = 0.32289 mV-sec	Mean = 0.32036 mV-sec

B. Use the mean measurement from the table above to compute the percentage increase in EMG activity recorded between the weakest clench and the strongest clench of the Dominant arm.

Calculation: $\frac{0.32289 - 0.15136}{0.15136} \times 100$

Answer: 113.326% Increase

C. Tonus Measurements

Between Clenches #	*Dominant arm*	*Nondominant arm*
1-2	Mean = 0.02551 mV-sec	Mean = 0.01552 mV-sec
2-3	Mean = 0.03061 mV-sec	Mean = 0.03028 mV-sec
3-4	Mean = 0.04813 mV-sec	Mean = 0.02080 mV-sec

II. Questions

D. Compare the mean measurement for the right and left maximum clench EMG cluster.

Are they the same or different? Same <u>Different</u>

Which one suggests the greater clench strength? <u>Right</u> Left Neither

Explain

The higher measurement values found in section A for the Dominant Arm (Right) suggest that the clench strength is higher than in the Non-Dominant Arm (Left).

E. What factors in addition to sex contribute to observed differences in clench strength?

In addition to sex, factors such as muscle size, age, and average muscle use can have an affect on the observed differences in clench strength.

F. Does there appear to be any difference in tonus between the two forearm clench muscles? <u>Yes</u> No

Would you expect to see a difference? Does Subject's gender influence your expectations? Explain.

It would be expected that there would be a slight difference between the dominant and non-dominant muscles, as the dominant arm is in more constant use than the non-dominant.

G. Explain the source of signals detected by the EMG electrodes.

The EMG signals detected by the electrodes are due to the propagation of motor nerve impulses. The simultaneous propagation of theses impulses through muscle fibers cause large enough voltage differences in the skin to be detectable via the electrodes.

H. What does the term "motor unit recruitment" mean?

Motor unit recruitment refers to the increase in available motor units in a muscle when and increase in the contraction strength of that muscle is required.

I. Define skeletal muscle tonus.

Skeletal muscle tonus is a phenomenon in which skeletal muscle maintains a constant slight tension, maintaining the muscle in a state or readiness.

J. Define electromyography.

Electromyography is the detection, amplification and recording of skin voltages, which are produced, and vary, due to contractions of skeletal muscle.

End of Lesson 1 Data Report