

V. DATA ANALYSIS

FAST TRACK Data Analysis

1. Enter the **Review Saved Data** mode.
2. Note Channel Number (CH) designations:

<i>Channel</i>	<i>Displays</i>
CH 1	Reflex Hammer Strike
CH 2	Response

NOTE: The example figures (at right and on following page) depict how data should appear depending on which type of response was recorded. If the lesson was conducted using SS2L Leads and EMG electrodes, refer to the *EMG data* figure. If the SS21L twin-axis Goniometer was used, refer to the *Goniometer data* figure.

3. Set up the measurement boxes as follows:

<i>Channel</i>	<i>Measurement</i>
CH 1	Delta T
CH 1	Max
CH 2	Max

4. Set up the display for optimal viewing of first **Knee Jerk Reflex** recording.

Data Analysis continues....

Detailed Explanation of Data Analysis Steps

If entering **Review Saved Data** mode from the Startup dialog or Lessons menu, make sure to choose the correct file.

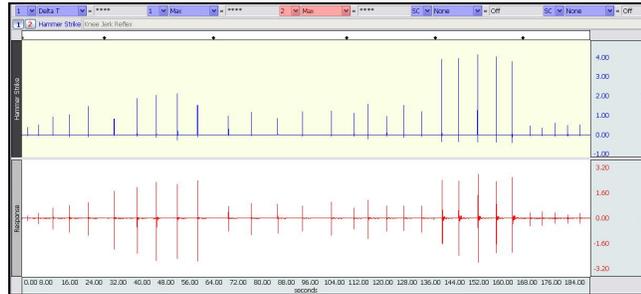


Fig. 20.25a Example EMG data

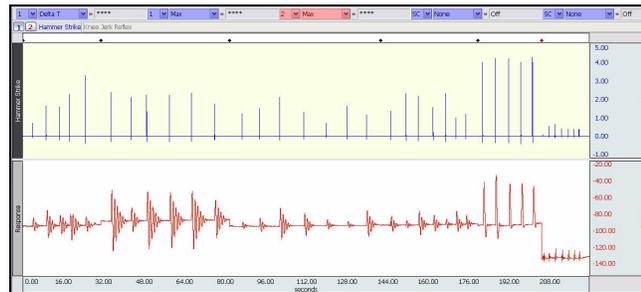


Fig. 20.25b Example Goniometer data

The measurement boxes are above the marker region in the data window. Each measurement has three sections: channel number, measurement type, and result. The first two sections are pull-down menus that are activated when you click them.

Brief definition of measurements:

Delta T: measures the difference in time between the end and beginning of the selected area.

Max: measures the maximum amplitude in the selected area.

The *selected area* is the area selected by the I-Beam tool (including endpoints)

Note: The append event markers  mark the beginning of each recording. Click the event marker to display its label.

Useful tools for changing view:

Display menu: Autoscale Horizontal, Autoscale Waveforms, Zoom Back, Zoom Forward

Scroll Bars: Time (Horizontal); Amplitude (Vertical)

Cursor Tools: Zoom Tool

Buttons: Overlap, Split, Show Grid, Hide Grid, -, +

Hide/Show Channel: *Alt* + click (Windows) or *Option* + click (Mac) the channel number box to toggle channel display.

To measure reaction times, select the area from the onset of the hammer strike in CH 1 to the onset of EMG activity in CH2.

5. Zoom in on the first Hammer Strike and Response in the δ Knee Jerk Reflex \ddot{o} recording and take measurements:

- a) To measure reaction times, select the area from the onset of the hammer strike (CH 1) to the onset of Response (CH 2) and note the Delta T measurement (Fig 20.26).



A

- b) To measure amplitudes, select an area that encompasses the Hammer Strike pulse and the maximum amplitude of the Response and note the Max measurements for each channel (Fig. 20.27).



B

6. Use the Horizontal Scroll Bar to scroll to each successive hammer strike and response within the δ Knee Jerk Reflex \ddot{o} recording and note all reaction time and amplitude measurements.



A, B

7. Repeat Steps 5 and 6 for all recordings.
Note:

- Each recording begins with an append event marker. Click on the marker to display the label.
- Scroll through using the Horizontal Scroll Bar, or zoom out (Display > Autoscale Horizontal followed by Display > Autoscale Waveforms) and then zoom in on the desired data.



A, B

8. **Save** or **Print** the data file.

9. **Quit** the program.

END OF DATA ANALYSIS



Fig. 20.26a Reaction Time measurement (EMG data)

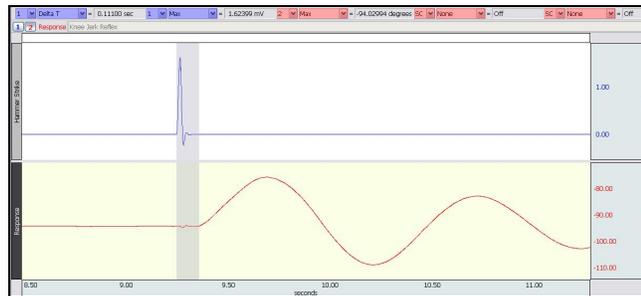


Fig. 20.26b Reaction Time measurement (Goniometer data)



Fig. 20.27a Amplitude measurement (EMG data)

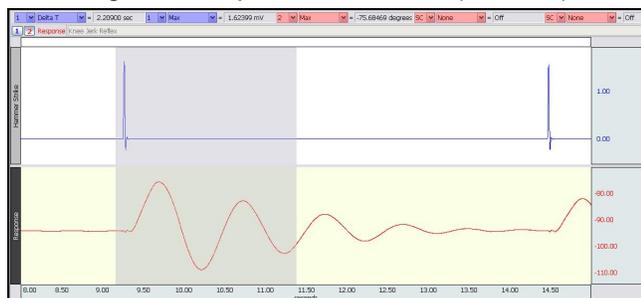


Fig. 20.27b Amplitude measurement (Goniometer data)

An electronically editable Data Report is located in the journal (following the lesson summary,) or immediately following this Data Analysis section. Your instructor will recommend the preferred format for your lab.

END OF LESSON 20

Complete the Lesson 20 Data Report that follows.

SPINAL CORD REFLEXES

DATA REPORT

Student's Name: _____
 Lab Section: _____
 Date: _____

Subject Profile

Subject's Name: _____
 Gender: Male / Female Age: _____ Height: _____ Weight: _____

I. Data Tables—Spinal Cord Reflex measurements

A. Complete Table 20.3 with reaction time (latent period) data for each recording and complete the required calculations. Reaction time is measured from onset of hammer strike to onset of EMG activity.

Table 20.3

Trial #	1 Delta T					
	Knee Jerk	Jendrassik maneuver	Mental Math Distraction	Flexor Withdrawal	Voluntary Knee Jerk	Ankle Jerk
1	msec	msec	msec	msec	msec	msec
2	msec	msec	msec	msec	msec	msec
3	msec	msec	msec	msec	msec	msec
4	msec	msec	msec	msec	msec	msec
5	msec	msec	msec	msec	msec	msec
Average						
	msec	msec	msec	msec	msec	msec

B. Complete Table 20.4 with Strike Force and Response Amplitude data for each recording and complete the required calculations. Use the result to calculate the relationship between strike force (CH1) and response amplitude (CH2). **Note about response amplitude portion of table:** If using the SS2L Lead Set (EMG), units are expressed in millivolts (mV). If using the Goniometer (SS21L), units are expressed in degrees (deg).

Table 20.4

Measure	Trial #	Knee Jerk	Jendrassik maneuver	Mental Math Distraction	Flexor Withdrawal	Voluntary Knee Jerk	Ankle Jerk
		1	mV	mV	mV	mV	mV
2	mV	mV	mV	mV	mV	mV	mV
1 Max	3	mV	mV	mV	mV	mV	mV
	4	mV	mV	mV	mV	mV	mV
	5	mV	mV	mV	mV	mV	mV
Calculated Average							
SS2L (mV) or Goniometer (degrees)	1						
	2						
	2 Max	3					
		4					
		5					
	Calculated Average						

II. Questions

1. What is the physiological meaning of the term "reflex"?

2. List the anatomical components of a reflex pathway in correct sequence from beginning to end.

3. What is the difference between an ipsilateral reflex and a contralateral reflex?

4. Define "reciprocal inhibition" and explain its importance.

5. The stronger the percussion hammer taps on the patellar tendon, the greater the reflex contraction of the quadriceps femoris. Explain.

6. The Jendrassik maneuver may exaggerate spinal reflexes such as the patellar reflex. Explain.

7. When a physician elicits the patellar reflex, what physiological activities are being examined? List four. (Hint: think of the function of each component of the reflex pathway).

8. Briefly explain the function of the supraspinal descending inhibitory motor pathways.

9. There are two pathways by which the Jendrassik maneuver facilitates alpha motor neuron output. Describe one.

III. OPTIONAL Active Learning Portion

A. *Hypothesis*

B. *Materials*

C. *Method*

D. *Set Up*

E. *Experimental Results*

VI. DATA ANALYSIS

FAST TRACK Data Analysis

10. Enter the **Review Saved Data** mode.

11. Note Channel Number (CH) designations:

Channel	Displays
CH 1	Reflex Hammer Strike
CH 2	Response

NOTE: The example figures (at right and on following page) depict how data should appear depending on which type of response was recorded. If the lesson was conducted using SS2L Leads and EMG electrodes, refer to the "EMG data" figure. If the SS21L twin-axis Goniometer was used, refer to the "Goniometer data" figure.

12. Set up the measurement boxes as follows:

Channel	Measurement
CH 1	Delta T
CH 1	Max
CH 2	Max

13. Set up the display for optimal viewing of first "Knee Jerk Reflex" recording.

Detailed Explanation of Data Analysis Steps

If entering **Review Saved Data** mode from the Startup dialog or Lessons menu, make sure to choose the correct file.

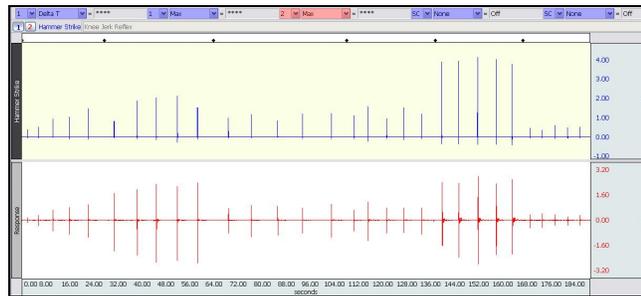


Fig. 20.25a Example EMG data

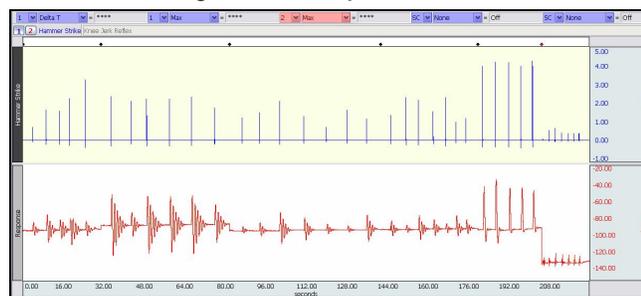


Fig. 20.25b Example Goniometer data

The measurement boxes are above the marker region in the data window. Each measurement has three sections: channel number, measurement type, and result. The first two sections are pull-down menus that are activated when you click them.

Brief definition of measurements:

Delta T: measures the difference in time between the end and beginning of the selected area.

Max: measures the maximum amplitude in the selected area.

The "selected area" is the area selected by the I-Beam tool (including endpoints)

Note: The append event markers \blacklozenge mark the beginning of each recording. Click the event marker to display its label.

Useful tools for changing view:

Display menu: Autoscale Horizontal, Autoscale Waveforms, Zoom Back, Zoom Forward

Scroll Bars: Time (Horizontal); Amplitude (Vertical)

Cursor Tools: Zoom Tool

Buttons: Overlap, Split, Show Grid, Hide Grid, -, +

Hide/Show Channel: $\text{Alt} + \text{click}$ (Windows) or $\text{Option} + \text{click}$ (Mac) the channel number box to toggle channel display.

To measure reaction times, select the area from the onset of the hammer strike in CH 1 to the onset of EMG activity in CH2.

Data Analysis continues....

14. Zoom in on the first Hammer Strike and Response in the δ Knee Jerk Reflex \ddot{o} recording and take measurements:

- c) To measure reaction times, select the area from the onset of the hammer strike (CH 1) to the onset of Response (CH 2) and note the Delta T measurement (Fig 20.26).



A

- d) To measure amplitudes, select an area that encompasses the Hammer Strike pulse and the maximum amplitude of the Response and note the Max measurements for each channel (Fig. 20.27).



B

15. Use the Horizontal Scroll Bar to scroll to each successive hammer strike and response within the δ Knee Jerk Reflex \ddot{o} recording and note all reaction time and amplitude measurements.



A, B

16. Repeat Steps 5 and 6 for all recordings.
Note:

- Each recording begins with an append event marker. Click on the marker to display the label.
- Scroll through using the Horizontal Scroll Bar, or zoom out (Display > Autoscale Horizontal followed by Display > Autoscale Waveforms) and then zoom in on the desired data.



A, B

17. **Save** or **Print** the data file.

18. **Quit** the program.

END OF DATA ANALYSIS



Fig. 20.26a Reaction Time measurement (EMG data)

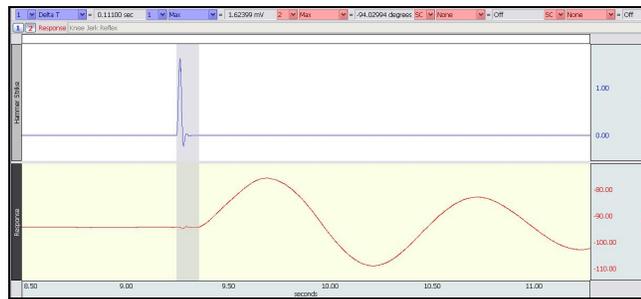


Fig. 20.26b Reaction Time measurement (Goniometer data)

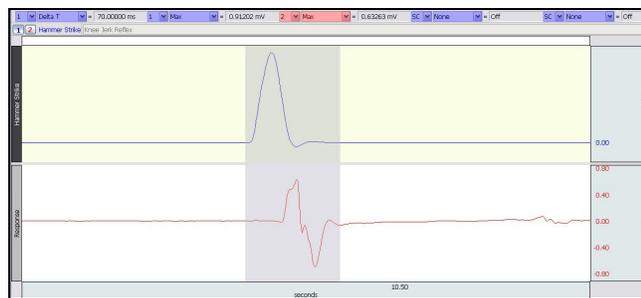


Fig. 20.27a Amplitude measurement (EMG data)

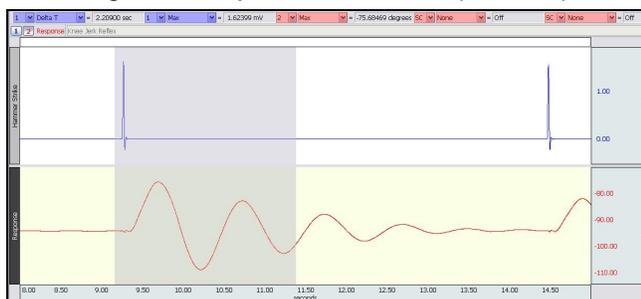


Fig. 20.27b Amplitude measurement (Goniometer data)

An electronically editable Data Report is located in the journal (following the lesson summary,) or immediately following this Data Analysis section. Your instructor will recommend the preferred format for your lab.

END OF LESSON 20

Complete the Lesson 20 Data Report that follows.

SPINAL CORD REFLEXES

DATA REPORT

Student's Name: _____
 Lab Section: _____
 Date: _____

Subject Profile

Subject's Name: _____
 Gender: Male / Female Age: _____ Height: _____ Weight: _____

III. Data Tables—Spinal Cord Reflex measurements

C. Complete Table 20.3 with reaction time (latent period) data for each recording and complete the required calculations. Reaction time is measured from onset of hammer strike to onset of EMG activity.

Table 20.3

Trial #	1 Delta T					
	Knee Jerk	Jendrassik maneuver	Mental Math Distraction	Flexor Withdrawal	Voluntary Knee Jerk	Ankle Jerk
1	msec	msec	msec	msec	msec	msec
2	msec	msec	msec	msec	msec	msec
3	msec	msec	msec	msec	msec	msec
4	msec	msec	msec	msec	msec	msec
5	msec	msec	msec	msec	msec	msec
Average						
	msec	msec	msec	msec	msec	msec

D. Complete Table 20.4 with Strike Force and Response Amplitude data for each recording and complete the required calculations. Use the result to calculate the relationship between strike force (CH1) and response amplitude (CH2). **Note about response amplitude portion of table:** If using the SS2L Lead Set (EMG), units are expressed in millivolts (mV). If using the Goniometer (SS21L), units are expressed in degrees (deg).

Table 20.4

Measure	Trial #	Knee Jerk	Jendrassik maneuver	Mental Math Distraction	Flexor Withdrawal	Voluntary Knee Jerk	Ankle Jerk
		1	mV	mV	mV	mV	mV
1 Max	2	mV	mV	mV	mV	mV	mV
	3	mV	mV	mV	mV	mV	mV
	4	mV	mV	mV	mV	mV	mV
	5	mV	mV	mV	mV	mV	mV
	Calculated Average						
2 Max	1						
	2						
	3						
	4						
	5						
Calculated Average							

IV. Questions

10. What is the physiological meaning of the term "reflex"?

11. List the anatomical components of a reflex pathway in correct sequence from beginning to end.

12. What is the difference between an ipsilateral reflex and a contralateral reflex?

13. Define "reciprocal inhibition" and explain its importance.

14. The stronger the percussion hammer taps on the patellar tendon, the greater the reflex contraction of the quadriceps femoris. Explain.

15. The Jendrassik maneuver may exaggerate spinal reflexes such as the patellar reflex. Explain.

16. When a physician elicits the patellar reflex, what physiological activities are being examined? List four. (Hint: think of the function of each component of the reflex pathway).

17. Briefly explain the function of the supraspinal descending inhibitory motor pathways.

18. There are two pathways by which the Jendrassik maneuver facilitates alpha motor neuron output. Describe one.

III. OPTIONAL Active Learning Portion

F. *Hypothesis*

G. *Materials*

H. *Method*

I. *Set Up*

J. *Experimental Results*
