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V. DATA ANALYSIS

FAST TRACK Data Analysis

1. Enter the **Review Saved Data** mode.
   - Note channel number (CH) designations:

Channel	*Displays*
CH 1	**Airflow** (hidden)
CH 2	**Volume**

   - Note the measurement box settings:

Channel	*Measurement*
CH 2	**P-P**
CH 2	**Max**
CH 2	**Min**
CH 2	**Delta**

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.

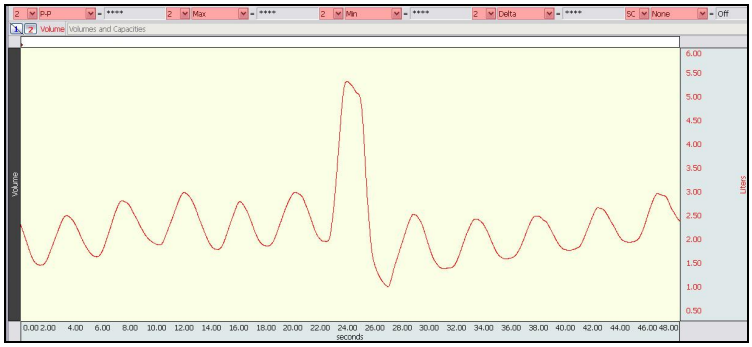

Fig. 12.23 Example data

All measurements will be performed on the Volume (CH 2) data. The Airflow (CH 1) data, used to calculate volume, is hidden to avoid confusion. It can be shown by ñAlt + clickò (Windows) or ñOption + clickò (Mac) the channel number box.

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:

P-P (Peak-to-Peak): Subtracts the minimum value from the maximum value found in the selected area.

Max: Displays the maximum value in the selected area.

Min: Displays the minimum value in the selected area.

Delta: Computes the difference in amplitude between the last point and the first point of the selected area.

The ñselected areaò is the area selected by the I-Beam tool (including endpoints).

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: ñAlt + clickò (Windows) or ñOption + clickò (Mac) the channel number box to toggle channel display.

2. Review the measurements described in the Introduction to identify the appropriate selected area for each.

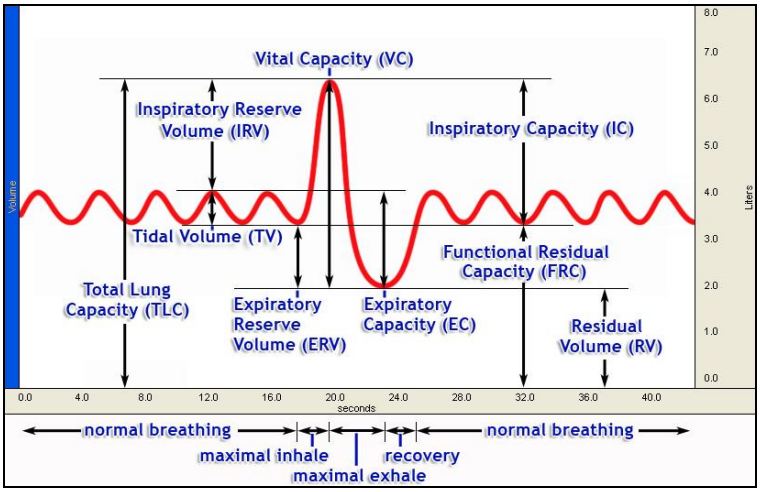

Fig. 12.24 Measurement areas for respiratory volumes and capacities

3. Calculate the Predicted Vital Capacity, then measure VC and then compare the two.

A

The selected area should start just prior to the maximum peak and end just after the minimum peak. The **P-P** (peak to peak) measurement displays the VC.

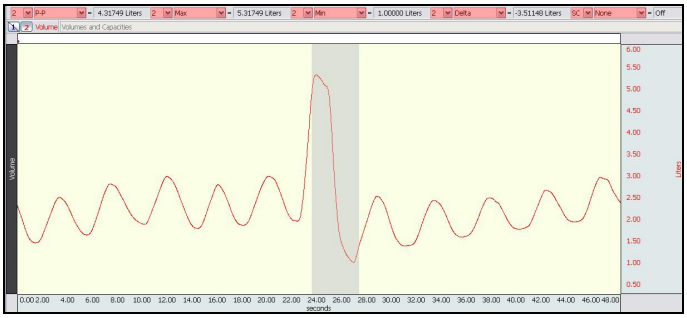

Fig. 12.25 Example selected area; P-P measures VC

4. Take two measures on the third TV cycle:
   a) Use the **I-beam** cursor to select the **inhalation** of cycle 3 and note the P-P result (Fig. 12.26). The selected area should be from the valley to the peak of the third cycle.

B

The **P-P** measurement in Fig. 12.26 represents the first value required for the averaged TV calculation.

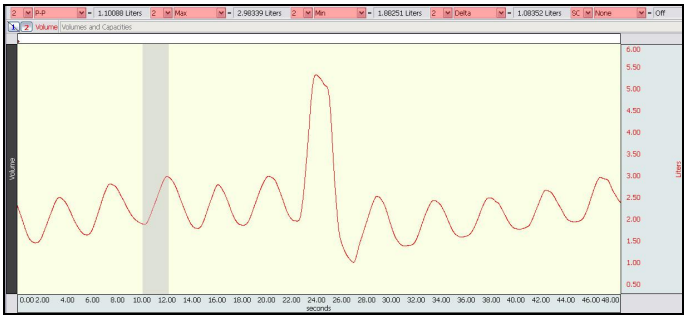

Fig. 12.26 Example of cycle 3 – Inhale selection to measure TV

   b) Use the **I-beam** cursor to select the **exhalation** of cycle 3 and note the P-P result (Fig. 12.27). The selected area should be from the peak to the valley of the third cycle.

B

The **P-P** measurement in Fig. 12.27 represents the second value required for the averaged TV calculation.

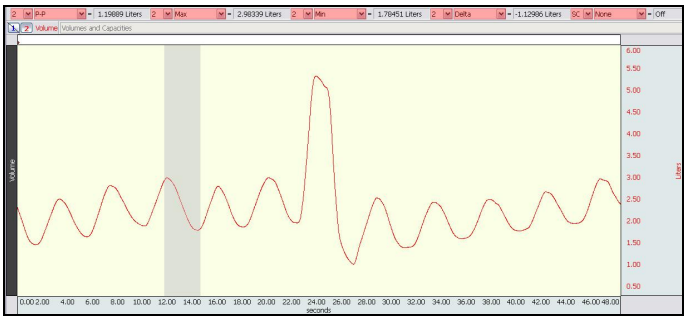

Fig. 12.27 Example of cycle 3 – Exhale selection to measure TV

Data Analysis continues…

5. Repeat TV measurements, as in Step 4, but on cycle 4 data. Calculate average value of all four TV measurements.

   B

6. Use the I-beam cursor and measurement tools to record the volumes and capacities required by the data report (defined in Fig. 12.24).

   B

7. Answer the questions at the end of the Data Report.
8. **Save** or **Print** the data file.
9. **Quit** the program.

END OF DATA ANALYSIS

Note that the Delta measurement requires precise placement of the selected area.

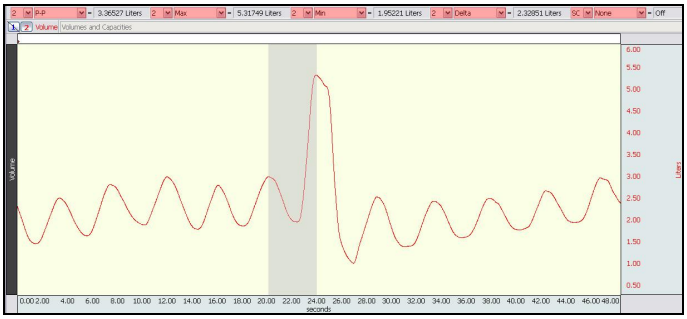

Fig. 12.28 Example selection for measurements of TLC (Max) and IRV (Delta)

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 12

Complete the Lesson 12 Data Report that follows.

PULMONARY FUNCTION I

- *Volumes and Capacities*

DATA REPORT

Studentôs Name: _____

Lab Section: _____

Date: _____

Subject Profile

Name:_____ Height:_____ Gender: Male / Female

Age:_____ Weight:_____

I. Data and Calculations

A. Vital Capacity

i) Predicted: Use the equation below to calculate your **Predicted Vital Capacity**:_____

Equations for Predicted Vital Capacity (Kory, Hamilton, Callahan: 1960)		*Where*	
Male	V.C. = 0.052H - 0.022A ï 3.60	V.C.	Vital Capacity in liters
Female	V.C. = 0.041H - 0.018A ï 2.69	H	Height in centimeters
		A	Age in years

ii) Observed: Use the P-P result to note **Observed Vital Capacity**: _____

= 2 P-P

iii) Observed *vs.* Predicted

What is Subjectôs observed Vital Capacity to predicted Vital Capacity as a percentage?

Observed/Predicted VC = _____ x 100= _____%

Note: Vital capacities are dependent on other factors besides age and height. Therefore, 80% of predicted values are still considered ñnormal.ò

B. Volume & Capacity Measurements

Complete Table 12.2 with the requested measurement results and calculate results per the formulas provided.

Table 12.2 Measurements

Title	Measurement Result	Calculation
Tidal Volume TV	a = 2 P-P Cycle 3 inhale: b = 2 P-P Cycle 3 exhale: c = 2 P-P Cycle 4 inhale: d = 2 P-P Cycle 4 exhale:	(a + b + c + d) / 4 =
Inspiratory Reserve Volume IRV	2 Delta	
Expiratory Reserve Volume ERV	2 Delta	
Residual Volume RV	2 Min	Default = 1 (*Preference setting*)
Inspiratory Capacity IC	2 Delta	TV + IRV =
Expiratory Capacity EC	2 Delta	TV + ERV =
Functional Residual Capacity FRC		ERV + RV =
Total Lung Capacity TLC	2 Max	IRV + TV + ERV + RV =

C. Observed vs. Predicted Volumes

Using data obtained for Table 12.2, compare Subjectôs lung volumes with the average volumes presented in the Introduction.

Table 12.3 Average Volumes *vs.* Measured Volumes

Volume Title	Average Volume	Measured Volume
Tidal Volume TV	Resting subject, normal breathing: TV is approximately 500 ml. During exercise: TV can be more than 3 liters	greater than equal to less than
Inspiratory Reserve Volume IRV	Resting IRV for young adults is males = approximately 3,300 ml females = approximately 1,900 ml	greater than equal to less than
Expiratory Reserve Volume ERV	Resting ERV for young adults is males = approximately 1,000 ml females = approximately 700 ml	greater than equal to less than

II. Questions

D. Why does predicted vital capacity vary with height?

E. Explain how factors other than height might affect lung capacity.

F. How would the volume measurements change if data were collected after vigorous exercise?

G. What is the difference between volume measurements and capacities?

H. Define **Tidal Volume**.

I. Define **Inspiratory Reserve Volume**.

J. Define **Expiratory Reserve Volume**.

K. Define **Residual Volume**.

L. Define **Pulmonary Capacity**.

M. Name the **Pulmonary Capacities**.

End of Lesson 12 Data Report