TITLE: Lab 14- Respiratory Physiology

PURPOSE:

The purpose of this lab is to use a spirometer. This will determine the lung capacity of a tidal volume, vital capacity, inspiratory capacity, inspiratory reserve volume, expiratory capacity, and expiratory reserve volume. The recording will be obtained from spirometer may be analyzed to determine the relative pulmonary condition of humans. The timed vital capacity (TVC) or forced expiratory volume (FEVT) will also be calculated. The impendence pneumography and the measurement of ventilation rates will be recordering the changing impendence of an expanding and contacting thorax.

PROCDURE:

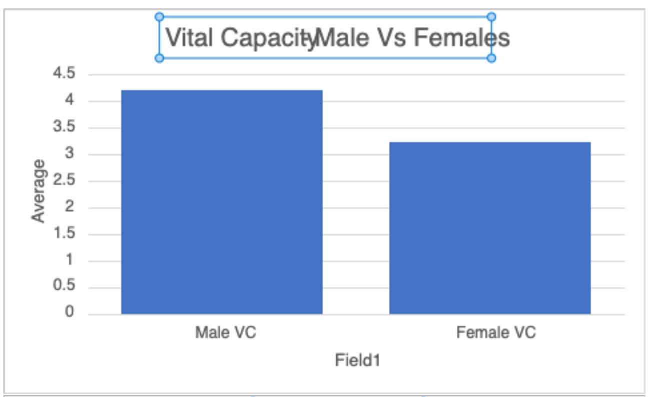
14-B

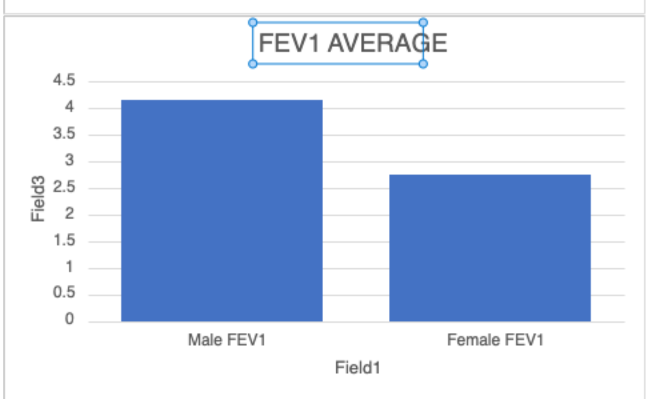
1. The Morgan ComPAS computer program has already calculated and factored in the BTPS(Body Temperature Pressure Saturation) correction factor.
2. Fully insert the Pneumotrac filter/mouthpiece you purchased at the bookstore. If you have difficulty keeping air from leaking through your nose, you may need to wear a nose clip, as air leakage will result in inaccurate results.
3. Be sure the correct student nformation is loaded up before you start the FVC test.
4. After starting the FVC test, follow the verbal instructions of your instructor: begin with your mouth off the mouthpiece so the pneumotach can equilibrate; after getting a good seal with your mouth, start with tidal breathing ;when youare ready, take in the deepest breath possible, then forcefully blowitout as fast as you can and keepsqueezing until instructed to stop. The instructor willprint out your “FVC Volume Time Curve” (part of your 14-B results), and it should look similar to Figure 14-2
5. To calculate the vital capacity for the FVC test (also called the forced expiratory volume),measure the height of thehighest peakof the curve in mm and multiply that length inmm by66.67ml/mm(our FVC conversion factor). Then round off ml to wholenumbers. (NOTE: this is similar to the 14-A SVC calculations, but with a differentconversion factor.) Just like in 14-A, use the gridlines to double check that your figuresare in the ballpark (e.g., if you calculated the vital capacity in Fig. 14-2 onp.94to be3635 ml, you must be off because you can tell from just looking at the gridlines that it ismuch closer to 4500 ml than 3635 ml). Can you see this in Fig. 14-2?
6. Go to the “1 second” vertical line in your FVC graph and measure the height where thecurved line crosses the 1 second vertical line in the same way as you did for the FVC instep5. This is your FEV1volume.
7. Divide the volume you calculated for FEV1by the volume you calculated for the vitalcapacity in step 6, and then multiply by 100 to determine the percentage of the vitalcapacity exhaled at one second.
8. Go to the “3 second” vertical line in your FVC graph and measure the height where thecurved line crosses the 3 second vertical line in the same way as you did in steps5and6. This is your FEV3volume.
9. Divide the volume you calculated for FEV3bythe volume you calculated for the vitalcapacity in step 6, and then multiply by 100 to determine the percentage of the vitalcapacity exhaled at three seconds.
10. Compare these values to the predicted values and explain possible causes for anydifferences.

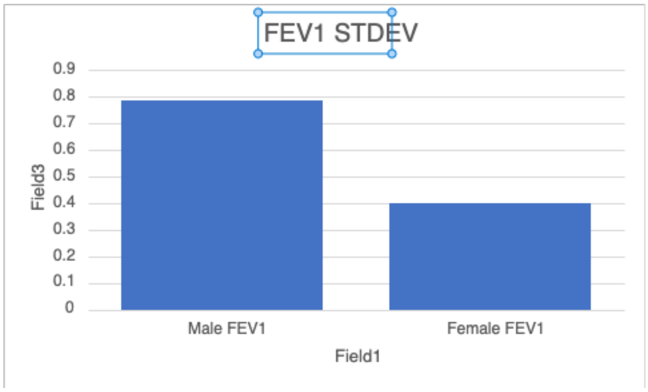
14-C

1. Open the grey plastic box on your lab desk that says “BASELINE LungCapacitySpirometer” on the lid. Inside the lid of the box is a white paper that has specificinstructions, please read the whole inside page with “how to use.”
2. Insert the clear plastic mouthpiece on the “Windmill-Type” spirometer and make surethe measurement indicator is at the zero position before beginning.
3. Make sure you only exhale into the spirometer, DO NOT inhale from it.
4. After exhaling, record the measurement from the spirometer.Be sure to place yourused plastic mouthpiece in the correct tubafter use (the tub is labeled).
5. Calculate your predicted vital capacity from the nomograms available in lab. Using astraightedge, make a line matching your height and age to the vital capacity prediction.Note that the VC is in liters whereas other measurements have been taken in milliliters.
6. Compare the values obtained from the portable spirometer, the predicted values fromthe nomograms, and the value obtained from the Koko spirometer, if available. Howcan you account for any differences? (NOTE: yourpredicted VCfrom the nomogram, anda comparison to the measured VC in 14-A should be included in your discussion of 14-A

RESULTS:







DISSCTION:

There's multiple lung volumes and capacities are measures of the amount of an air in the respiratory system. Some of them are tidal volume (TV) the average is 500mL, inspiratory reserve volume (IRV) the average is around 3,000mL. The maximum volume of air that can be inhaled after normal tidal volume inhalation. There's expiratory reserve volume (ERV) the average is approximately 1,200mL. The maximum volume of air that can be exhaled after a normal tidal volume exhalation. There's also residual volume (RV) the average is 1,200mL. The volume of air remaining in the lungs after a maximal exhalation. There's vital capacity (VC) the average is 4,500mL. It's the maximum volume of air that can exhaled after maximal inhalation it's the sum of tidal volume, inspiratory reserve volume and expiratory reserve volume. There's also total lung capacity (TLC) the average is approximately 5,700mL. The maximum volume of the air the lungs can hold its sum of the vital capacity and residual volume. Then, there's functional residual capacity (FRC) the average is around 2,400mL. The volume of air remaining in the lungs after a normal tidal volume. Finally, this some functions of the lung capacity and there average values providing general reference.

CONCLUSION:

In conclusion, the impedance pneumography is a non-invasive method used to measure respiratory parameters. The respiratory rate is calculated by measuring the frequency of impedance changes associated with each breath. The tidal volume is indirectly estimated by assessing the amplitude of impendence changes. There's also minute ventilation is calculated by multiplying respiratory rate by tidal volume. The inspiratory time and expiratory time these times can be derived from the shape and duration of impendence waveform. The derived parameters can be system may be provided derived parameter such as dynamic lung compliance and other indices related to respiratory mechanic. These are important to know impedance pneumography is a valuable tool for assisting respiratory function