Mariah Hall

Bio 125- Tuesday Lab

November 14, 2023

Laboratory 14 Report- Respiratory Physiology

Purpose:

The purpose of this lab is to learn about lung inhalation and exhalation. We learn about how to measure vital capacity. We're able to test our own VC and compare it to our classmates. This lab also teaches about the other devices used to measure volumes of air involved in pulmonary ventilation and lung capacities.

Procedure:

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 information 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 you are ready, take in the deepest breath possible, then forcefully blow it out as fast as you can and keep squeezing until instructed to stop.

5. To calculate the vital capacity for the FVC test (also called the forced expiratory volume), measure the height of the highest peak of the curve in mm and multiply that length in mm by 66.67ml/mm (our FVC conversion factor). Then round off ml to whole numbers. (NOTE: this is like the 14-A SVC calculations, but with a different conversion factor.) Just like in 14-A, use the gridlines to double check that your figures are 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 is much 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 the curved 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 vital capacity in step 6, and then multiply by 100 to determine the percentage of the vital capacity exhaled at one second.

8. Go to the “3 second” vertical line in your FVC graph and measure the height where the curved 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 vital capacity in step 6, and then multiply by 100 to determine the percentage of the vital capacity exhaled at three seconds.

10. Compare these values to the predicted values and explain possible causes for any differences.

4-B: The Forced Vital Capacity (FVC) or Forced Expiratory Volume (FEVT)–MorganComPAS Pneumotra

Procedure

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 information 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 you are ready, take in the deepest breath possible, then forcefully blow it out as fast as you can and keep squeezing until instructed to stop. The instructor will print out your “FVC Volume Time Curve” (part of your 14-B results), and it should look like Figure 14-2.

5. To calculate the vital capacity for the FVC test (also called the forced expiratory volume), measure the height of the highest peak of the curve in mm and multiply that length in mm by66.67ml/mm (our FVC conversion factor). Then round off ml to whole numbers. (NOTE: this is like the 14-A SVC calculations, but with a different conversion factor.) Just like in 14-A, use the gridlines to double check that your figures are 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 is much 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 the curved line crosses the 1 second vertical line in the same way as you did for the FVC instep5. This is your FEV1volume.

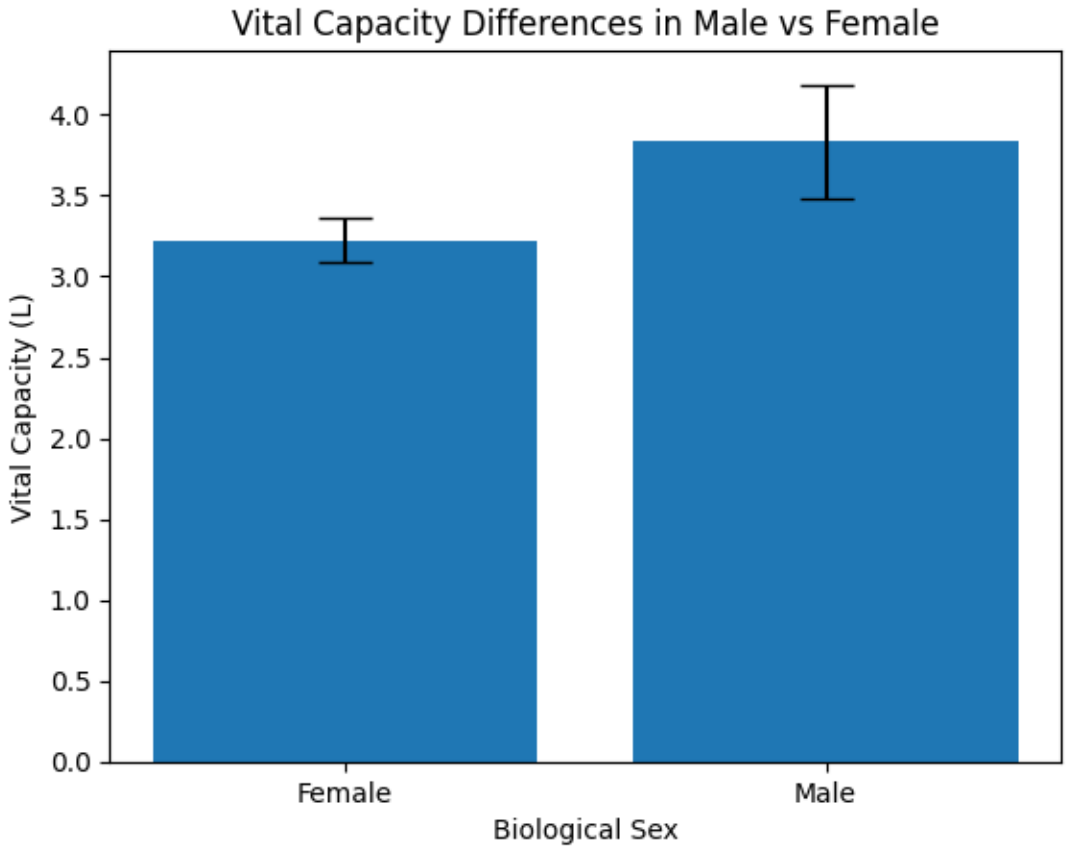
7. Divide the volume you calculated for FEV1by the volume you calculated for the vital capacity in step 6, and then multiply by 100 to determine the percentage of the vital capacity exhaled at one second.

8. Go to the “3 second” vertical line in your FVC graph and measure the height where the curved 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 vital capacity in step 6, and then multiply by 100 to determine the percentage of the vital capacity exhaled at three seconds.

10. Compare these values to the predicted values and explain possible causes for any differences

Results:



Discussion:

This lab was hard. I didn’t realize how hard it was for me to blow out for 5 seconds. I could barely make it to 5 seconds and the highest I could get for my VC was 2.5. I did notice that my male lab partner did have a higher number than I did, and he was able to blow out for 5 seconds with no problem. I have done PFT’s in the past and that was also difficult for me. Overall, this lab was fun to do. Especially to laugh at each other for having a “weak blow”.

Conclusion:

-Vital capacity is the maximum amount of air a person can expel from the lungs after a maximum inhalation.

-Age and gender can affect a person’s vital capacity.

- Forced Vital capacity can be decreased temporarily or permanently.

-Different medical conditions can affect lung capacity like COPD.