**Pulse Rate/Blood Pressure Exercise Lab: Honors Anatomy and Physiology**

**Background Information**

Pulse is the alternate expansion and relaxation of an artery that corresponds to contractions and relaxations of the left ventricle. The pulse measures the rate of the heartbeat and is measured in beats per minutes. The average resting pulse rate is between 70- 80 beats per minute.

Blood pressure measures the pressure exerted onto the inside of an arterial wall as the ventricle contracts ( systolic pressure) and the pressure that remains as the ventricle relaxes ( diastolic pressure) Blood pressure is measured with a sphygmomanometer.

Once the sleeve of the sphygmomonometer has been inflated, the flow of blood through the brachial artery will be sealed off. As the pressure is released from the sleeve, the pressure is gradually reduced from the artery until a threshold is reached where blood will first be forced through that artery. This is the systolic pressure and corresponds to the pressure generated by the contracting of the left ventricle. This pulsing pressure can be heard with the stethoscope from the systolic pressure reading until the pulse may no longer be heard which indicates the diastolic pressure reading. Average BP readings are 120/ 80 (systolic over diastolic)

**Materials and Methods** Lab Partner Sphygmomonometer Stethoscope Timer StairsPaper Pencil Graph Paper

**Part 1. Resting Pulse Rate**

Have your partner sitting next to you. Place the three middle fingers of your hand over the radial artery at your partner’s wrist and feel the pulse. Count the number of beats in 15 seconds. Then, multiply this value by four and this will be the resting pulse. Record this number on the data table as RESTING PULSE RATE.

**Traditional Blood Pressure**

Wrap the sleeve of the sphygmomanometer around the arm at the left brachial artery and inflate by pumping the bulb. The silver valve of the side of the bulb must be closed or the air will not fill the sleeve (if you pump several times and the pressure does not begin to rise, the valve may not be closed). Inflate to about 160 on the dial. With the stethoscope held firmly in the antecubital region so you will be able to hear the pulse through the brachial artery, slowly allow pressure to decrease while you listen carefully and silently and watch the dial on the sphygmomonometer. The first rush of liquid that you hear is the blood sneaking through the brachial artery under systolic pressure. Continue to listen (you will hear the pulse) until the pulsing sound stops. You must remember the two numbers. Record your partner’s RESTING BLOOD PRESSURE.

OR use the Automatic Blood pressure cuff….

Wrap the sleeve of the sphygmomanometer around the arm at the left brachial artery and inflate by pressing the on switch. Wait patiently while the blood pressure is read. When it is done, record your data in the data table under RESTING BLOOD PRESSURE.

**Part 2** **Now, the fun begins!!**

1. Have your partner lay face down on the floor. Record their pulse rate and blood pressure under Trial #1.
2. Continue having them lay down for an additional 4 minutes. SHHHHHHHHHHH! They must be still and quiet… After 4 minutes, take their “vital signs” again and record in the data table as TRIAL #2.
3. Now, have them Stand Up QUICKLY! IMMEDIATELY take their pulse and blood pressure again. Record in the data Table as TRIAL #3.
4. Have your partner go to the stair well and run up and down the stairs for 4 minutes. Then record their vital signs as Trial #4 .
5. Have your partner sit down and rest for 4 minutes. Then record data as Trial #5.
6. Have them wait another 4 minutes and record data as Trial #6. Is their pulse rate back to normal yet????
7. Wait four MORE minutes while your partner continues to rest quietly. Measure the pulse and blood pressure again and record as Trial #7.

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Names\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Problem:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Data ---- YOUR OWN DATA! Student Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Resting Pulse Rate = \_\_\_\_\_\_\_\_\_ Resting Blood Pressure = \_\_\_\_\_\_\_

Trial # Pulse Rate ( BPM) Position/ Activity Blood Pressure

1 \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_

2 \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_

3 \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_

4 \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_

5 \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_

6 \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_

7 \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_

**Graph**  Make a triple line graph of the systolic pressure, diastolic pressure and pulse rate over time. Mark the Activity on the x axis **along with the minutes. Staple your graphs to this paper.**

**Questions**

1. What was the control in the experiment?
2. In which position – sitting, lying down, or standing - is blood pressure the highest? The lowest?
3. Explain why blood pressure measurements differ when reclining and standing.
4. If a doctor told you that your blood pressure is too high, why would you be concerned?
5. Define pressure points.
6. Which artery is palpated at the following pressure points? a. Wrist? b. Front of ear? c. Side of neck? d. Groin? E. Back of knee?
7. What vital role does blood pressure play?
8. The two elements that determine blood pressure are cardiac output (how much blood the heart puts out) and the friction inside the blood vessels.

Name two things that increase the cardiac output.

1. b.

Name two things that increase the friction inside the vessels.

1. b.
2. Why is it more dangerous to cut an artery than a vein? (relate your answer to blood pressure)
3. What is the effect of hemorrhage on blood pressure?

Explain your answer.

1. What is vasoconstriciton?
2. What happens to blood vessels when you are scared or frightened?

Why?

1. How do cold packs reduce swelling?
2. Why do they say you should apply heat to an injury after 24 hours ?
3. Why do people get “reddish cheeks” after they’ve been drinking alcohol?
4. Define hypertension
5. Define hypotension
6. What is chronic hypertension?
7. Why is chronic hypertension called the “silent killer”?
8. Each pound of fat you gain can add miles of blood vessels in your body. Why is being overweight bad on your heart?
9. Define EKG.

Below, draw and label a normal EKG Wave.

Tell what the heart is doing at each phase of the wave.

P wave =

QRS wave =

T wave =

When does someone have to “fibrillated’?

1. Define arteriosclerosis
2. What two arteries are most commonly affected by arteriosclerosis?

a. b.

Discussion : What did you learn about blood pressure, pulse rate, general circulation and exercise in this lab? Were there any errors? What did you learn about your own health? Did you like the lab or not? Why or why not?

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3 \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_

4 \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_

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