Circulatory System Lab

Exercise 1: Heart Sounds

Introduction: The heart sounds are heard as a long, loud “lubb” sound followed by a softer, shorter “dub” sound. The “lubb” is the first heart sound. It is the result of vibrations set up by the sudden closing of the valves between the atria and the ventricles and by the opening of the valves between the ventricles and the arteries. The “dub” is the second heart sound and is caused by vibrations set-up by the closing of the valves between the ventricles and the arteries following ventricular contraction.

Objective: To learn the correct use of a stethoscope

Materials: Stethoscope

Procedure:
1. On your partner, place the bell of the stethoscope about 3cm to the left of the sternum at the space between the fifth and sixth ribs. Listen for the heart beat until you can hear the “lubb/dub.”
2. Next, place the stethoscope bell in the space between the second and third ribs either to the right or to the left of the sternum. Listen for the heart beat again. It should be clearer than before.
3. Now, have your partner run in place for 30 steps and again listen to the heart sounds. They should be faster and louder than before.
4. Now switch and let your partner do steps 1-3.
Exercise 2: Heart Rate

Introduction: The pulse can be felt by placing the fingers on any of the main arteries. Some of these are the carotid artery, at the front of the neck, the maxillary artery, under the edge of the lower jaw, the temporal artery, on the temple, and the radial artery, on the inside of the wrist, just below the thumb. The easiest way to locate the pulse is at the radial artery of the wrist just below the thumb.

Objective: To learn how to correctly take a pulse

Materials: None

Procedure:
1. Locate your partner’s radial pulse by placing your middle and index fingers (not your thumb) on the wrist and press gently until you can feel the pulsations of the radial artery.
2. Calculate your partner’s heart rate once per minute for three minutes while he or she is sitting quietly. To calculate the heart rate, count the pulsations for every fifteen seconds and multiply by four.
3. Calculate your partner’s heart rate once per minute for three minutes while he or she is standing quietly.
4. Calculate your partner’s heart rate immediately after running in place for fifty steps.
5. Continue to check the heart rate every minute. How long does it take your partner’s heart rate to return to the same rate it was in number three?

Exercise 3: Taking Blood Pressure

Introduction: Blood pressure is reported as a xx/xx mm Hg. The top number is called systolic pressure. This is the pressure created by the ventricles contracting, forcing blood into the arteries. The bottom number is called diastolic pressure. This is the pressure just before the ventricles contract, and it is the lowest number. Healthy blood pressure for age 12 is 113/59 mm Hg.

Objective: To learn how to correctly measure blood pressure

Materials: Electronic sphygmomanometer

Procedure:
1. Have your partner sit down and rest his or her arm on the desk.
2. Make sure the cuff is deflated and the exhaust valve is open.
3. Locate the brachial artery on the inside of the upper arm, just above the bend in the elbow on the body side.
4. Wrap the cuff around the upper arm, 2-3 cm above the bend in the elbow. Line up the white line on the cuff with the artery.
5. Rapidly inflate the cuff to 160 mm Hg.
6. Slowly exhaust the cuff; the machine will give you a blood pressure reading.
7. Never leave the cuff inflated on your arm for more than a few seconds.
8. Repeat steps 1-7 with your partner’s other arm.

**Exercise 4: Activity and Blood Pressure**

**Objective:** To learn how activity affects blood pressure

**Materials:** Electronic sphygmomanometer

**Procedure:**
1. Have one partner step up rapidly fifteen times.
2. Immediately measure the blood pressure, and continue to do so every three minutes until it returns to the normal level.

**Exercise 5: Isometric Exercise and Blood Pressure**

**Introduction:** Isometric, or static exercise has a pronounced effect on blood pressure. *If you have heart disease, do not participate in this activity.*

**Objective:** To learn how isometric activity affects blood pressure

**Materials:** Electronic sphygmomanometer

**Procedure:**
1. Place the pressure cuff on the left arm.
2. Clench the right hand into a tight fist.
3. Measure blood pressure.
4. Rest one minute and take the blood pressure again with the right hand relaxed.
5. Repeat this exercise three times for each partner.