

LABORATORY 11 – CARDIOVASCULAR MEASUREMENTS

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Purpose:

The purpose of this lab was to measure the general condition of our hearts. This included the blood pressure, heart sounds, and pulse rate. Measuring the heart rate between resting and exercises reflected our physical fitness.

Procedure:

11-A: Determination of blood pressure

Procedure

1. Wrap the pressure cuff of the sphygmomanometer snugly around the upper left arm of your lab partner. Your lab partner should assume a relaxed, sitting or supine position.
2. Place the stethoscope securely over the brachial artery. Close the pressure valve and begin pumping up the rubber ball.
3. You will begin to hear the arterial pulse as you pass the diastolic pressure. Continue pumping until the pulse is not heard, approximately 10 mmHg above your partner's normal systolic pressure. The brachial artery is now totally occluded.
4. Slowly open the pressure valve and listen for the pulse sounds to reappear as the pressure drops. These are known as Korotkoff sounds.
5. The first sound heard signals the systolic BP. Record this value from the scale.
6. The sound will become louder as the pressure drops until it finally starts to become muffled. Record the pressure at which the sound vanishes. This signals the diastolic BP. Record your blood pressure as systole/diastole
7. Alternate with your lab partner and repeat these procedures.
8. Next, measure the BP of each of you immediately upon standing. (NOTE: be sure to have your cuff inflated prior to standing, so that you can begin to release pressure immediately upon standing.)
9. Lastly, measure the BP three minutes after standing. Record these values for your use and on the chalkboard.
10. Discuss the orthostatic response in terms of the receptors used and the effects of postural change. Include any limitations to obtaining reliable results.

1-B: Demonstration of a measure of physical fitness

Procedure

1. Select three girls and three boys. Each student will take his/her resting pulse rate for one minute and record this value.
2. Each student will step up on the bench for a minute.
3. Immediately upon returning to the laboratory, each student will record his/her pulse after exercise.
4. Each student will take his/her pulse at one minute intervals until the resting pulse is reestablished. (NOTE: The best method to employ is to take the pulse rate for 15 seconds and multiply by 4.)
5. These results will be recorded on the chalkboard for discussion. Is there a difference between the exercisers and the non-exercisers? Which student(s) do you consider to be in better physical condition? Why?

6. Determine the target heart rate range for each student (if the ages are available) and for yourself. The target heart rate range determines the heart rate that should be maintained for 20-30 minutes, at least 3 times per week for cardiovascular fitness. To determine your target heart rate range do the following calculations for the Karvonen formula (only use numbers rounded off to whole numbers):

- $220 - \text{your age} = \text{maximum heart rate (max HR)}$
- $\text{Max HR} - \text{resting HR} = \text{HR reserve}$
(to find your resting heart rate, take your pulse before getting out of bed each morning for three days and then take the average)
- $\text{target heart rate range} =$
 $(\text{HR reserve} \times 60\%) + \text{resting HR} = \text{low target heart rate}$
 $(\text{HR reserve} \times 80\%) + \text{resting HR} = \text{high target heart rate}$

7. Include your calculations for your target heart rate in the results section of your report.

8. Evaluate the class results in terms of target heart rate and level of fitness for each individual.

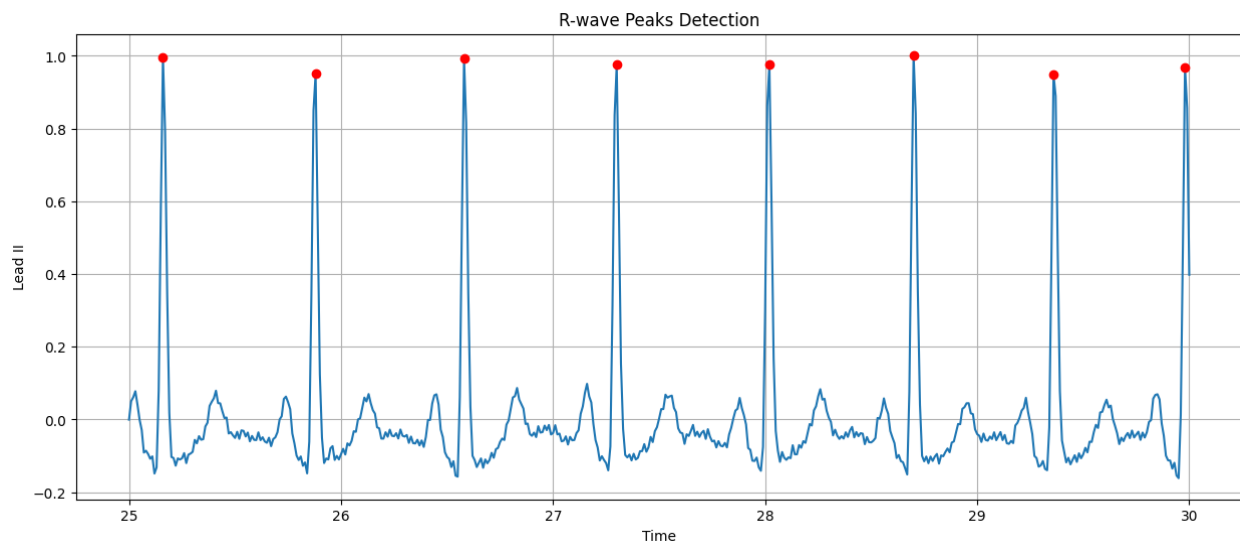
Results:

Group	F 1	F 2	F 3	Favg	Fdev	Fsem	M 1	M 2	M 3	Mavg	Mdev	Msem
Resting_InClass	58	68	63	63	5	2.88675134594813	64	74	68	68.6666666666667	5.03322295684717	2.90593262902712
Resting_outside	66	64	68	66	2	1.15470053837925	66	72	68	68.6666666666667	3.05505046330389	1.76383420737639
0	72	112	90	91.3333333333333	20.0333056017556	11.5662343819316	116	102	100	106	8.71779788708135	5.03322295684717
1	68	52	72	64	10.5830052442584	6.11010092660781	70	80	62	70.6666666666667	9.01849950564579	5.2068331172711
2	56	56	50	54	3.46410161513775	2	68	70	66	68	2	1.15470053837925
3	58	64	61	61	3	1.73205080756888	66	70	60	65.3333333333333	5.03322295684717	2.90593262902712

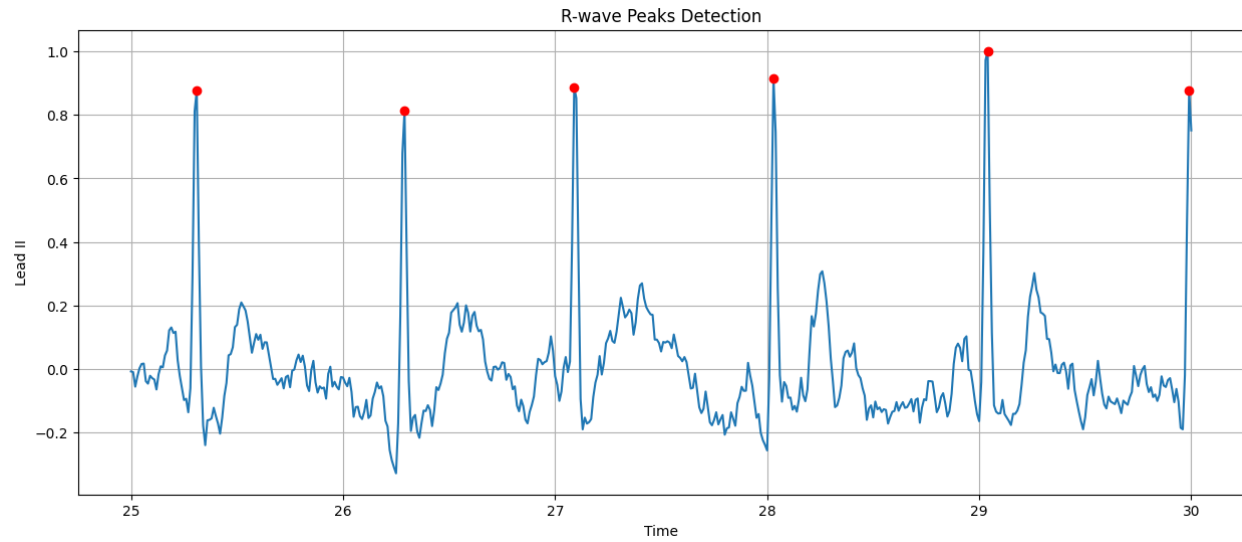
4. Recordings will then be taken with the student holding his/her breath for at least 20 seconds, hopefully for 30 seconds.
5. The experiment will be repeated with the student holding his/her breath and placing his/her head into a bucket of ice cold water.
6. Include copies of the results in your lab report.
7. Evaluate the three sets of data in terms of the bradycardia and vasoconstriction. What are the adaptive advantages of these reflexes?

Results:

Held Breath:



Submerge face in water:



Discussion:

Heart rate slowed down after submerging face in water .

Females' heart rate lowered more than starting heart rate. Could be from being outside and was cold.

Conclusion:

Heart rate can vary between sex as well as activity/exercise. After performing an exercise outside the classroom we came to the conclusion that females had a faster recovery time than males. The second experiment to submerge face in cold water slowed down the heart rate.