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Lab 11- Cardiovascular Measurements
28 November 2023

Purpose

The purpose of this lab was to give us a better understanding on how cardiovascular parameters may be measured with other methods that are not an EKG, and how those methods reflect the general condition of an individual. We also measure the effects of postural change and exercise on cardiovascular parameters using different types of equipment. We were also able to analyze changes in pulse rate before, during, and after exercise to determine how quickly individuals can return to their resting pulse rate.

Procedures

11-A: Determination of blood pressure

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.

11-B: Demonstration of a measure of physical fitness

1. Select three students who exercise regularly and three students who do not. Each student will take his/her resting pulse rate for one minute and record this value.
2. Each student will then run the track twice at a fast but comfortable pace.

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):
a. 220 – your age = maximum heart rate (max HR)
b. Max HR – resting HR = 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)
c. target heart rate range =
(HR reserve x 60%) + resting HR = low target heart rate (HR reserve x 80%) + resting HR = high target heart rate
Example: 20 year old with a resting heart rate of 65 beats per minute 220–20=200(maxHR)
200 – 65 = 135 (HR reserve)
(135 x 60%) + 65 = 81 + 65 =146
(135 x 80%) + 65 = 108 + 65 = 173
This student's target heart rate range would be 146 – 173 beats per minute.
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 everyone.

Results

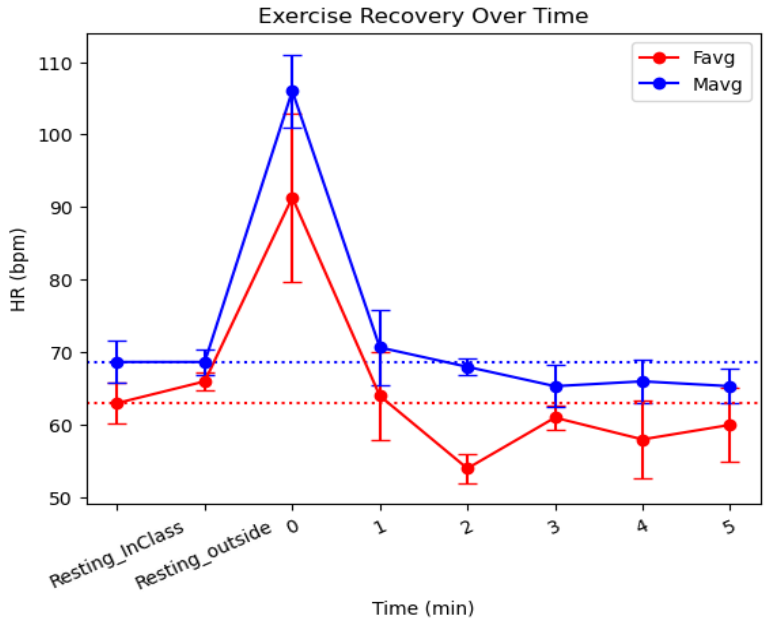
11-A: Determination of blood pressure

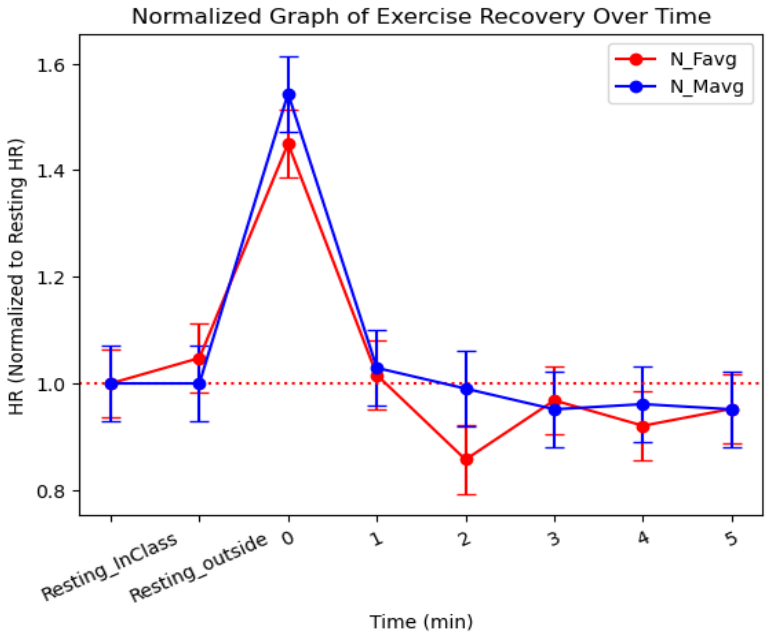
	Ana	**Atzi**
BP Sitting	124/64	123/60
BP Standing	110/60	130/80

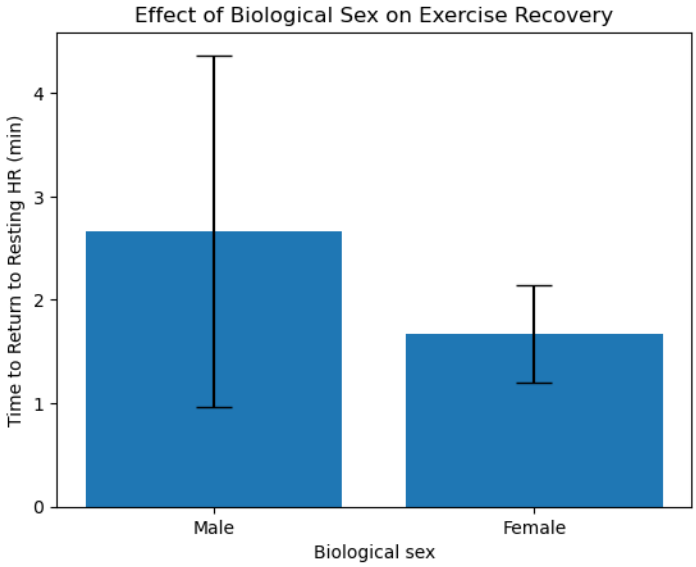
BP After 3 mins of Standing	100/60	123/53

11-B: Demonstration of a measure of physical fitness

	resting in class	resting outside	After exercise	1	2	3	4	5
F1	58	66	72	68	56	58	48	50
F2	68	64	112	52	56	64	66	66
F3	63	68	90	72	50	61	60	64
M1	64	66	116	70	68	66	68	64
M2	74	72	102	80	70	70	70	70
M3	68	68	100	62	66	60	60	62







Discussion

I loved the first part of the lab because it's important for me to know how to manually measure blood pressure and it was fun seeing the results after different positions. However, I didn't find the second part that interesting, maybe because I was tired that day and I didn't want to participate so I didn't know what exactly was happening. Exercise is cool I like to work out.

Conclusion

- Understand the events that occur during the taking of a normal blood pressure.
- Know the normal blood pressure values for ventricular systole and diastole.
- Understand the effects of postural changes on blood pressure.
- Understand the function of a well-developed cardiovascular system in relation to physical fitness.
- Be able to calculate your target heart rate range for cardiovascular fitness.
- Be able to describe the major events that occur during a mammalian diving response.