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| Biomed 3A |
| Blood Pressure Analysis at Different Positions |
| By: Alysa Chirillo and Jody Baker |
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**Abstract:**

 The purpose of this experiment was to see the difference (if there was any) in blood pressure if a person was sitting upright or lying down. In the procedure, one subject’s blood pressure was monitored while they were sitting upright, still, and relaxed in a chair. Then the subject’s blood pressure was monitored while they were still, relaxed, and lying down. The subject’s blood pressure while sitting upright was on average 88/46, and their blood pressure while lying down was 115/45. In conclusion, systolic blood pressure was greater when the subject was lying down rather than sitting upright.

**Background:**

 Beginning in Unit 4 of Principles of Biomedical Sciences, I have worked with and studied the heart. In class, I have drawn a diagram of the systems of the heart. Then I dissected a fresh pig heart, labeling each part. My lab partners and I have studied arteries and veins under a microscope, including an artery with plaque. Then we tested our heart rates, and we monitored one of our partner’s resting heart rate and then he ran laps and we monitored his heart rate again, noting how it quickened significantly. We learned how to take blood pressure manually and then with the computer program.

 In class we also saw a tutorial on how to dissect the heart, and many diagrams showing each system of the heart. We followed the curriculum, which directed us to design our own experiment in analyzing what can affect blood pressure. Jody and I decided to see what affect different positions have on blood pressure. Our goal was to see if blood pressure would raise or lower if a subject was lying down.

**Hypothesis:**

 If a subject is lying down, then their blood pressure will be lower than if they are sitting upright.

**Materials and Methods:**

 The materials used in this experiment were a subject, a computer with Logger Pro 3000, blood pressure cuff, paper and pencil.

The subject sits still, relaxed, and comfortable in a chair next to the computer. The subject’s arm is hooked up to the blood pressure cuff, which is then connected to the computer. The cuff is pumped to 160 888, and then the measurements are recorded when the computer is done. Three trials are run while the subject sits in the chair. Then the subject lies down on the floor and their blood pressure is monitored in the same way, with three trials run. Their systolic, diastolic, mean, and pulse is recorded based on the computer’s results. Both are compared to see which had a higher blood pressure.

**Results:**

 The systolic pressure of the subject while sitting upright during the three trials was 84, 90, and 90, and their systolic pressure while lying down was 129, 101, and 116. The subject’s diastolic pressure while sitting upright was 53, 42, and 42, and their diastolic pressure while lying down was 39, 45, and 52 mm Hg. Their mean while sitting upright during the three trials was 64, 69, and 69, and their mean while lying down was 49, 59, 70 mm Hg. The subject’s pulse while sitting upright during the three trials was 91, 97, and 97 BPM. Their pulse while lying down during the next three trials was 83, 44, and 70 BPM.

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| Blood Pressure of Subject Sitting Upright |
|  | Systolic Pressure | Diastolic Pressure | Mean | Pulse |
| Trial 1 | 84 | 53 | 64 | 91 |
| Trial 2 | 90 | 42 | 69 | 97 |
| Trial 3 | 90 | 42 | 69 | 97 |

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| Blood Pressure of Subject Lying Down |
|  | Systolic Pressure | Diastolic Pressure | Mean | Pulse |
| Trial 1 | 129 | 39 | 49 | 83 |
| Trial 2 | 101 | 45 | 59 | 44 |
| Trial 3 | 116 | 52 | 70 | 70 |

**Discussion:**

Even though the average diastolic pressure basically stayed the same, the systolic pressure was dramatically higher. Mean 888 and pulse lowered significantly. Based on the results, systolic blood pressure rises higher than when the subject is sitting up. This disproves the hypothesis posed before the experiment. In conclusion, blood pressure does depend on the different positions that a subject can be in, and will rise when a subject is lying down compared to when they are sitting upright.

Possible errors in this experiment would be feedback from cell phones, laptops, and other wireless technology that could affect the equipment used to pick up blood pressure signals. A way to remove errors would be to isolate the test area to a place with no other laptops around and no cell phones or other wireless technologies. Other tests that could be added to this experiment would be other body positions, such as standing, squatting, or even being upside down.

**Conclusion:**

 If a subject is lying down, then their systolic blood pressure will be higher than if they were sitting upright.