

Stress Testing Lab 3: Blood Pressure during Exercise

Objectives: to demonstrate some issues concerning blood pressure changes during exercise.

Materials and supplies needed: cycle ergometer, handgrip dynamometer, manual blood pressure cuff and stethoscope, finapres blood pressure device

Exercise 1: Demonstration of continuous changes in blood pressure during aerobic exercise.

Position a manual blood pressure cuff on a subject's left arm and a finapres blood pressure cuff on the right arm. Position the arm with the finapres at heart level. Adjust the height of the arm until the finapres and manual readings are similar.

Have the subject exercise for 1 minute at 3 work levels (50, 100, 150 watts) while monitoring blood pressure continuously with the finapres. Take manual blood pressure at the end of each stage (if possible) and after 1 and 2 minutes of recovery.

Questions:

1. How well did the finapres track the changes in blood pressure during exercise?
2. What happened to blood pressure immediately at the start of exercise? What increased first, heart rate or blood pressure?
3. What happened to blood pressure immediately after the subject stopped pedaling? Did it continue to rise as Ellsted suggests or immediately drop?

Exercise 2: Blood pressure differences in the right vs. the left arm

Have the same individual measure manual blood pressure on a subject's right and left arm while they are sitting quietly. Do this for 10 people. Do you see a consistent difference between the two arms?

Take the person with the largest difference between right and left arm. Have them cycle at 50 watts for 2 minutes. Get a blood pressure from the right and left arm (same measurer). Are the values the same?

Questions:

1. Was there a consistent difference?
2. If there was a difference, did it increase or decrease with exercise?

Exercise 3: Blood pressure during isometric exercise: effect of holding breath

Have a subject sit in a chair and hold a handgrip dynamometer in their dominant arm (arm bent about 90 degrees). Attach the finapres to the middle finger of the opposite hand. On the count of 3 have them perform a maximal contraction and hold for 3 sec. Wait one minute and repeat. Calculate the target intensity for 70% of MVC.

Have the subject hold 50% of his MVC until exhaustion or for 2 minutes while breathing normally. Note his highest blood pressure and heart rate at exhaustion?

Have the subject repeat the test, this time while holding his breathe and performing Valsalvas during the exercise. Note his highest blood pressure and heart rate at exhaustion.

Questions.

1. Was there a difference in the blood pressure responses?
2. What do you think would cause the blood pressure response to be different?
3. Why is it important to instruct subjects to continue to breathe normally during resistance exercise training?