L16 - Blood Pressure (4.1.2 Jan 11 2017) File name: DaveL16-L16 05/03/2019 12:45

First recording (starts at event labeled 'Left arm, seated 1'): Cuff on left arm, seated and relaxed.

Second recording (starts at event labeled 'Left arm, seated 2'): Cuff on left arm, seated and relaxed.

Third recording (starts at event labeled 'Right arm, seated 1'): Cuff on right arm, seated and relaxed.

Fourth recording (starts at event labeled 'Right arm, seated 2'): Cuff on right arm, seated and relaxed.

Fifth recording (starts at event labeled 'Right arm, supine 1'): Cuff on right arm, supine and relaxed.

Sixth recording (starts at event labeled 'Right arm, supine 2'): Cuff on right arm, supine and relaxed.

Seventh recording (starts at event labeled 'Right arm, after exercise'): Cuff on right arm, recovering from mild exercise.

L16 DATA REPORT

Student's Name:

Lab Section:

Date:

I. Data and Calculations

Subject Profile

Name: Height: Age: Time: Gender: Weight:

Note: This Data Report assumes that all lesson recordings were performed, which may not be the case for your lab. Please disregard any references to excluded recordings.

A. Systolic Measurements

Complete Table 16.2 with the systolic measurements for all data recordings. Note the pressure measurement at the event marker insertion point (where

Director audibly detected and marked systolic) and where the first Korotkoff sound was detected with the stethoscope microphone. Calculate the Delta difference between the trials for each condition, the trial average pressure, and the Delta difference between the event marker and stethoscope microphone average pressure measurements.

: (Table 16.2) Systolic Data

Systolic Pressure mmHg Condition Trial Audibly Detected Pressure (Event marker) Average Pressure (Calculate) A Microphone Detected Pressure (In data, unmarked) Average Pressure (Calculate) Left arm, seated 1 68.67960 61.30112 2 105.40826 100.87136 Right arm, seated 1 114.79030 109.31905 2 111.55378 106.97835 Right arm, lying down 1 35.94842 33.85817 2 76.32779 65.67426 Right arm, after exercise 1 150.77725 147.32882 For 'Right arm, after exercise' recording, calculate the Delta difference between 'Audibly Detected Pressure' and 'Microphone Detected Pressure' values, and record the result in the right column.

B. Diastolic Measurements

Complete Table 16.3 with the Diastolic measurements for all data recordings. Note the pressure measurement at the event marker insertion point (where Director audibly detected and marked diastolic) and where the Korotkoff sound disappeared from the stethoscope microphone. Calculate the Delta difference between the trials for each condition, the trial average pressure, and the Delta difference between the event marker and stethoscope microphone average pressure measurements.

: (Table 16.3) Diastolic Data

Diastolic Pressure mmHg Condition Trial Audibly Detected Pressure (Event marker) Average Pressure (Calculate) A Microphone Detected Pressure (In data, unmarked) Average Pressure (Calculate) Left arm, seated 1 9.68064 9.24681 2 69.48873 60.24154 Right arm, seated 1 2 62.68829 57.08209 Right arm, lying down 1 20.71947 15.52756 2 9.57468 7.34958 δ Right arm, after exercise 1 53.14240 36.33372 For 'Right arm, after exercise' recording, calculate the Delta difference between 'Audibly Detected Pressure' and 'Microphone Detected Pressure' values, and record the result in the right column.

C. BPM Measurements

Complete Table 16.4 with the BPM measurements from three cycles of each of the seven data recordings and calculate the mean BPM for each recording. * Cycle measurements: If ECG was recorded, use ; if ECG was not recorded, use .

: (Table 16.4) BPM

D. Summary of Mean Blood Pressure Data

Complete Table 16.5 with the average from sound data from tables 16.2 and 16.3 and then calculate the pulse pressure and the mean Arterial Pressure (MAP). Note the pressure measurements at the event marker insertion points (where Director audibly detected and marked systolic and diastolic).

OR

Pressure/Average Diastolic Pressure CONDITION SYSTOLE DIASTOLE BPM Calculations:

Table 16.2 Sound Average Table 16.3 Sound Average Table 16.4 Pulse pressure MAP Left arm, sitting up Right arm, sitting up Right arm, lying down Right arm, after exercise

E. Timing of Korotkoff Sounds

NOTE—This table requires ECG data, which is not recorded on MP45 systems. Complete Table 16.6 with the Delta T for each condition, and calculate the means.

: (Table 16.6) Timing of Sounds

Condition Trial 1 Trial 2 Mean (calculation) Left arm, sitting up 0.53200 0.21600 Right arm, sitting up 0.22200 0.22600 Right arm, lying down 0.79000 0.61600 Right arm, after exercise 0.31600

F. Calculation of Pulse

Speed Complete the calculation in Table 16.7 using "Right arm, seated" data.

: (Table 16.7) Result Distance Distance between Subject's sternum and right shoulder? cm Distance between Subject's right shoulder and antecubital fossa? cm Total distance? cm Time Time between R-wave and first Korotkoff sound? secs Speed Speed = distance/time = _____cm / _____sec cm/sec

II. Questions:

1. Note the difference in systolic pressure value between when the sound actually began, was detected by the stethoscope transducer, and was recorded, and the time when the observer first heard the sound and pressed the event marker keystroke. (Example: 141 mmHg – 135 mmHg = 6 mmHg). What factors could account for this difference? Would the observed difference be the same if measured by another observer? Explain your answer.

2. a) Does your systolic and/or diastolic arterial pressure change as your heart rate increases?

(b) How does this change affect your pulse pressure?

(c) How would you expect the systolic, diastolic and pulse pressures to change in a normal healthy individual as their heart rate increases?

3. Give three sources of error in the indirect method of determining systemic arterial blood pressure.

4. Use an equation that relates flow, pressure, and resistance to define mean arterial pressure:

5. Blood flow (liters per min.) through the pulmonary circuit equals blood flow through the systemic circuit, but pulmonary resistance to flow is 5 times less than the systemic resistance to flow. Using the equation in Question 4, show that mean pulmonary pressure is 5 times less than mean systemic pressure.

6. Define the first and second sounds of Korotkoff. Which sound is used to approximate systolic pressure and which sound is used to approximate diastolic pressure?

7. Why is mean arterial pressure not equal to (systolic pressure – diastolic pressure)/2?

8. Define pulse pressure. Explain, in terms of changes in systolic and diastolic pressures, why pulse pressure increases during exercise.

9. Give one reason why blood pressure in the left arm may be different than blood pressure in the right arm of a Subject at rest.

10. Name an artery other than the brachial that could be used for an indirect measurement of blood pressure and explain your choice.

End of Lesson 16 Data Report

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