

Blood pressure measurement



Biology

Human Physiology

Cardiovascular system



Difficulty level

easy



Group size

2



Preparation time

10 minutes



Execution time

10 minutes

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Teacher information

Application

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Principle of blood pressure measurement

Measuring blood pressure is an indispensable part of medical diagnostics. The aim of this experiment is to familiarise the students with the practical and theoretical background of this measuring technique by determining each other's blood pressure.

Other teacher information (1/2)

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Prior knowledge



The knocking sound heard in the stethoscope when the cuff pressure drops is called Korotkov's sound. It occurs when the value of the cuff pressure falls below that of the blood pressure and the pressure peaks of the inflowing blood rhythmically open the compressed brachial artery, causing it to collapse again and again. The first value measured indicates the systolic blood pressure, which occurs when the heart chambers contract (systole). The second value indicates the diastolic blood pressure exerted on the blood by the walls of the blood vessels during the dilation of the heart chambers (diastole). It is interesting to repeat the measurement on the same subject after exercise, e.g. 5, 10 or 15 squats, and compare the results.

Other teacher information (2/2)

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Learning objective



Students will learn the principle of blood pressure measurement, understanding the difference between systolic and diastolic blood pressure.

Tasks



1. Determine systolic and diastolic blood pressure.
2. Determination of the blood pressure under stress of the test person.

Safety instructions

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The general instructions for safe experimentation in science lessons apply to this experiment.

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Student Information

Motivation

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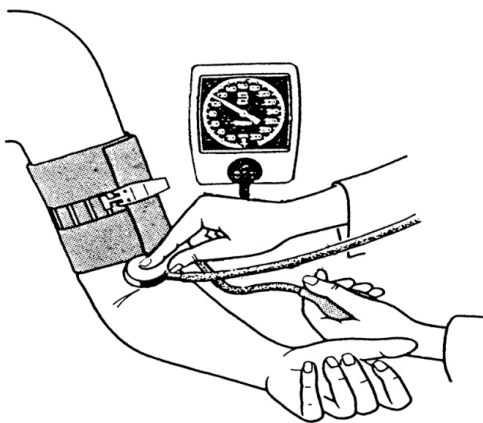


Principle of blood pressure measurement

Blood pressure is the pressure exerted on the blood by the walls of the blood vessels. It is measured indirectly. In a cuff placed around the upper arm, which consists of an outer, non-stretchable leaf and an inner, stretchable leaf, a measurable pressure is created by pumping air between the two leaves of the cuff. This pressure compresses the upper arm and with it the brachial artery. When the pressure just slightly exceeds the value of the internal pressure of the artery - i.e. the blood pressure - the artery is completely closed and the blood flow is cut off. By measuring the pressure required to completely occlude the brachial artery, blood pressure is indirectly determined.

Tasks (1/3)

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Principle of blood pressure measurement

- The blood pressure cuff (see figure on the left) is placed around the upper arm above the crook of the elbow of the test person in such a way that it lies loosely but does not slip. The arm should be slightly bent and relaxed with the palm open on the table top. The stethoscope microphone built into the cuff must be positioned exactly above the brachial artery.
- You insert the ear pieces of the stethoscope into your ears, close the adjusting screw on the inflator of the blood pressure cuff and pump so much air into the cuff that the pressure rises to about 240-267mbar (180-200 mm Hg).

Tasks (2/3)

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Blood pressure monitor

- Then very slowly and carefully turn the adjusting screw of the blower back on so that the cuff pressure only drops very gradually, listening for any noise in the stethoscope.
- When a certain cuff pressure is reached, a tapping sound can be heard in the stethoscope.
- This value is noted.

Tasks (3/3)

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Blood pressure cuff

- Slowly let the cuff pressure drop further and pay attention to the pressure at which this noise is no longer heard.
- This value is also noted.
- Then quickly allow the cuff pressure to drop completely and release the cuff from the arm.

Equipment

Position	Material	Item No.	Quantity
1	Blood pressure measuring unit	64234-00	1

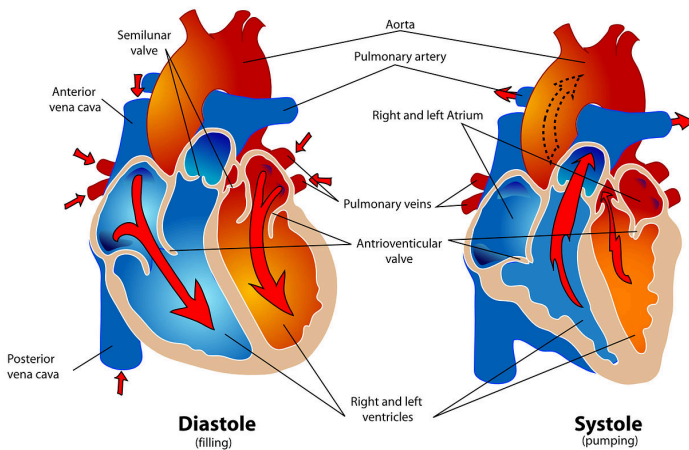
Set-up (1/2)

The knocking sound audible in the stethoscope, which suddenly occurs when the cuff pressure drops, is called Korotkov's sound. It is caused by the fact that the value of the cuff pressure just falls below that of the blood pressure and the pressure peaks of the flowing blood rhythmically open the compressed brachial artery and this collapses again and again.



Correctly applied stethoscope

Set-up (2/2)



Functionality of systole and diastole

The value noted first indicates the systolic blood pressure, which occurs during the contraction of the heart chambers - systole. The second value indicates the diastolic blood pressure exerted on the blood by the walls of the blood vessels during the dilation of the heart chambers - diastole. It is interesting to repeat the measurement in the same subject after exercise, for example, 5, 10 or 15 squats, and compare the results.



Report

Task 1

Please drag the terms into the correct gap in the text.

The contraction of the produces the blood pressure.

This is the value of the measurement.

, on the other hand, describes the pressure exerted by the walls of the blood vessels on the blood during the of the heart chambers.

This is the value of the measurement.

 Check

Task 2

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Stethoscope

How does the Korotkov noise come about?

- As the cuff pressure decreases, the subject's pulse becomes audible.
- The value of the cuff pressure exceeds that of the blood pressure, which is why the blood begins to pulsate in front of the cuff.
- The compressed brachial artery is rhythmically opened by the inflowing blood and then collapses again.

 Check

Task 3

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What happens if we do several squats in a row?

- Our pulse quickens, blood pressure doesn't change.
- Our blood pressure is rising.
- Our blood pressure drops.

 Check

Squat

Slide	Score/Total
Slide 15: Blood pressure	0/6
Slide 16: Korotkov's sound	0/1
Slide 17: Squats	0/1

Total  0/8

 Solutions

 Repeat