

Blood Pressure Measurement

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Blood Pressure

Blood Pressure is the force exerted on the walls of blood vessels by circulating blood.

-Blood pressure is measured in mmHg (millimeters of mercury) .

Normal Blood Pressure: 120/80 (mm Hg)

Normal systolic pressure: 120 mm Hg

Normal diastolic pressure: 80 mm Hg

Types of blood pressure

A. Systolic blood pressure (SBP)

The first, highest number, pressure exerted on the arterial walls during cardiac contraction (measured by palpatory method (120 mmHg))

B. Diastolic blood pressure (DBP)

The second, lower number, resting pressure on arterial walls during cardiac relaxation between beats (measured by auscultatory method (80 mmHg))

Hypertension

Hypertension is defined as the determined high blood pressure.

-Clinically, when the systolic pressure elevated above 150 mm Hg and diastolic pressure elevated above 90 mm Hg, it is considered as **hypertension**.

-If there is increase only in systolic pressure, it is called **systolic hypertension**.

Hypotension

Hypotension is the low blood pressure.

When the systolic blood pressure is less than 90mm Hg.

diastolic blood pressure is less than 60 mm Hg, it is considered as hypotension.

Types of blood pressure monitors (Sphygmomanometers)

1-Mercury Sphygmomanometer:

consist of :

- Glass tube containing mercury.
- Cuff (rubber bag).
- Stethoscope; ear tips, ear tubes, diaphragm.
- Air bulb (the pump).

2-Automatic Digital Sphygmomanometer:



Mercury device



Automatic Device

Methods of Blood Pressure Measurement

1-Palpatory

2-Auscultatory

1-Palpatory Method

Feel the radial pulse then, raise the pressure in the cuff to 200 mmHg, Note the level of pressure at which the pulse disappears, then start to lower the pressure slowly until feel the radial pulse ,reappears radial pulse again will be systolic blood pressure.

- It is used to measure systolic blood pressure only.

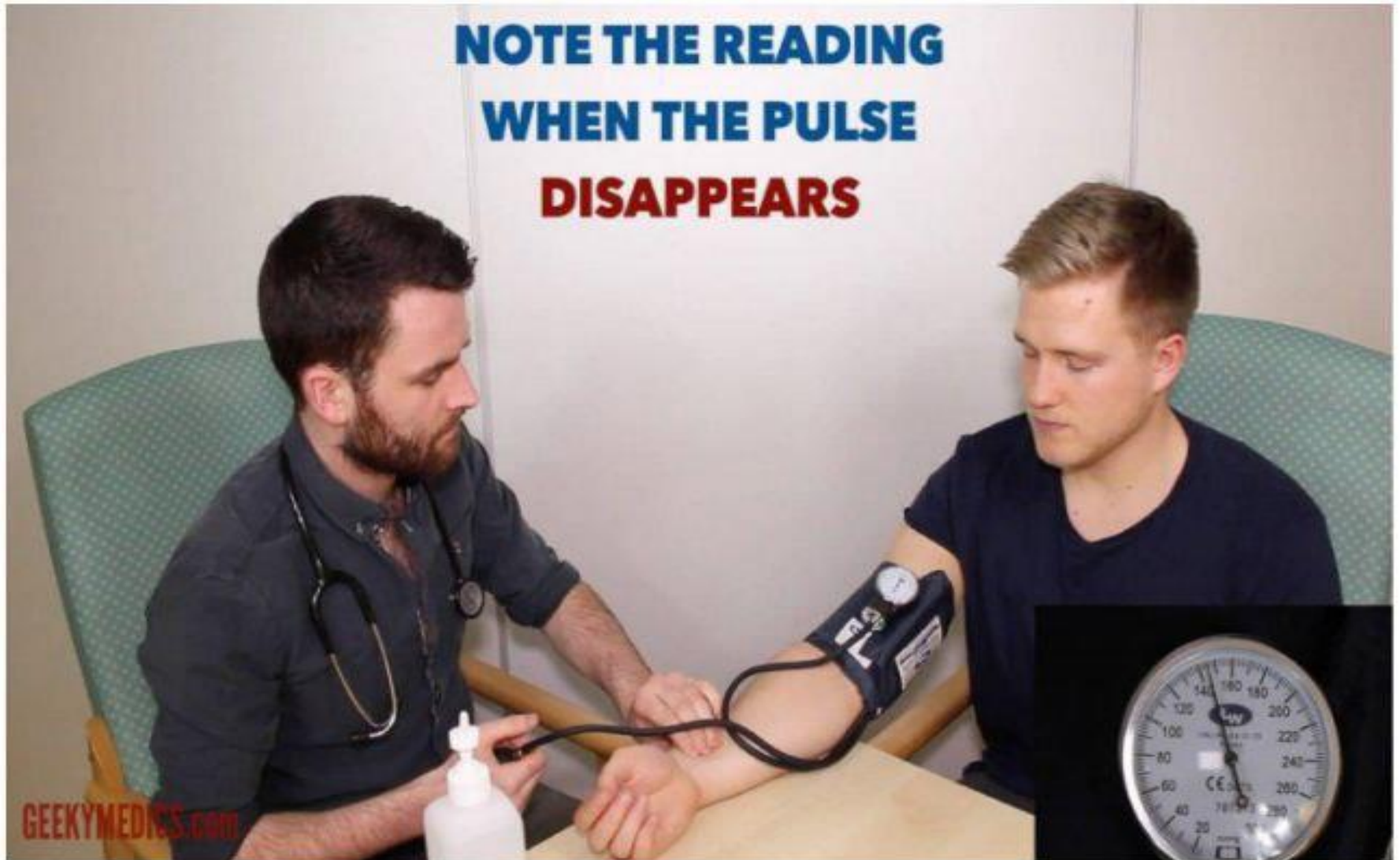
- Most common method for measuring blood pressure is palpatory but only systolic pressure can be measured with this method

- Disadvantage of palpatory method** is that the diastolic pressure cannot be measured.

Method of Measurement

1. Open the switch.
2. We close the valve not tightly.
3. We apply a cuff to the arm 2.5 cm above crease of elbow, centered over brachial artery, (feeling Locate radial pulse).
4. We increase the pressure of the cuff (by pumping air into it) using the air bulb, with our three fingers of the other hand on the radial artery of the patient.
5. When we stop feeling the radial pulsations (blood flow has stopped), we continue pumping the air till we raise the mercury bar 30* mmHg more then we stop pumping.
6. We open the valve gradually (1mmHg\second), with our eyes on the mercury. When we start feeling the pulsations, we read against the level of mercury indicating systolic BP.

Palpatory Methods



2-Auscultatory(Mercury Sphygmomanometer):

Method of measurement of mercury device

1. Open the switch.
2. We close the valve not tightly.
3. We apply a cuff to the arm 2.5 cm(1 in.) above crease of elbow, centered over brachial artery
4. We put the stethoscope's tips in external ear canal. Then, we diaphragm on the cubital fossa (on the brachial artery). put the
5. We increase the pressure by pumping the air bulb above the detected systolic BP by 30 mmHg to avoid auscultatory gap.
6. We open the valve gradually (1mmHg\second), and the first sound is approximately the systolic BP (known as heard Systolic Korotkoff), and the last heard sound; first disappearance of sound is the diastolic BP (known as Diastolic Korotkoff).

Auscultatory Methods by Mercury device



Korotkoff is the blood flow sound, heard by stethoscope, in the artery.

It is used to measure BP (usually brachial artery) via sphygmomanometer

It is called by this name due to the fact that the first scientist who detected these sounds is a Russian called Korotkoff.

Factors Influencing Blood Pressure

- 1- **Age** : Blood pressure increases with increasing age.
- 2- **Gender**: Women tend to have higher BP levels than men of similar age.
- 3- **Stress**: Anxiety, fear, pain, and emotional stress which increases BP.
- 4- **Physical activity** : Blood pressure varies throughout the day, with lower BP during sleep and rest.
- 5- **Medications**: Some medications directly or indirectly affect BP .