Measurement of Blood Pressure

"Non Invasive Method"

By
Assist. Prof. Dr Dler Gallaly
PhD in Medical Physiology

Dept. of Physiotherapy
Faculty of Applied Sciences
Tishk International University
Kurdistan Region, Erbil, Iraq.
2024 / 2025

Mob.#: (+964) 750 461 87 58
Email: dler.qader@tiu.edu.iq

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- Normal Values.
- Physiological Variations in BP.

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Objectives:

At the end of this experiment, you will be able to:

- **Define Blood Pressure.**
- **Describe the Sphygmomanometers.**
- **Measure BP via different methods.**
- **Describe the Korotkoff's sounds.**
- **Know Normal Ranges and Values of BP.**
- **Explain Physiological Variations in BP.**

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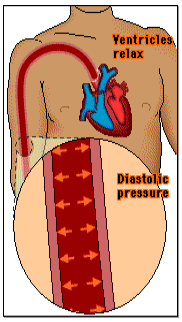
Introduction:

- **Definition:**

- Blood pressure (BP) is the force exerted by blood against the walls of blood vessels due to contraction of the heart and influenced by the elasticity of the vessel walls.
- Clinically, a measure of the pressure in arteries during ventricular systole and ventricular diastole.
- It is the pressure of the blood pumped out of the heart as it presses against the wall of the arteries.



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Introduction:

- **Aim:**
  - To determine BP of the given subject **at rest**.
- **Principles:**
  - The **pressure of blood in the brachial artery** is **balanced against the pressure of air in a rubber cuff** surrounding the artery.

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Apparatus Required:

- **Apparatus Required:**
  - **Stethoscope**

  - **Sphygmomanometer**
- **Types of Sphygmomanometers:**
  1. **Aneroid**
  2. **Electronic**
  3. **Mercuric**

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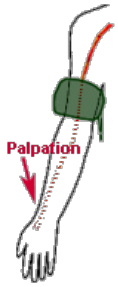
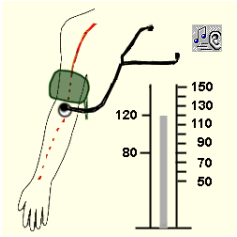
Non Invasive Methods for BP Measurement:

- **Two Methods are using for Measuring BP:**

1. Palpatory method



2. Auscultatory method



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❶Palpatory method:

1. The subject is asked to sit and allowed relax for 5 min.
2. The cuff is tied around the upper arm with the lower border of the cuff not <2.5 cm above the cubital fossa or **elbow**.
3. The **radial pulse** is palpated while the cuff is being inflated to a pressure slightly above the level at which the radial pulsation is no longer felt.
4. Now lower the pressure slowly by slightly opening the **release valve** and take the reading on the **manometer when the pulse is just palpable** that gives the **systolic pressure (SBP)**.
5. Diastolic pressure (DBP) cannot be determined by this method

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❷ Auscultatory method:

1. The **stethoscope** is placed over the brachial artery.
2. The pressure in the cuff is raised above the SBP (by~30mm.Hg) previously determined by the palpatory method.
3. The pressure is then lowered gradually (2–3 mm/sec.).
4. The sounds that are heard are the **Korotkoff's sounds**.

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Korotkoff's sounds:

- arterial sounds heard through a stethoscope applied to the brachial artery distal to the cuff of a sphygmomanometer that change with varying cuff pressure.
- are **pulsatile circulatory sounds** heard upon auscultation of the brachial artery.
- are due to blood jetting through the partly occluded vessel.
- are used to determine SBD and DBP.

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Korotkoff's sounds:

- **Korotkoff's sounds have <u>Five Phases</u>:**

A. 1st phase (first sound): **sharp tapping** sound (SBP).

B. 2nd & 3rd phases, **swishing sound**, murmur & then louder.

C. 4th phase, the sound becomes **muffled (soft)**.

D. 5th phase, **disappearance of the sound** (DBP).

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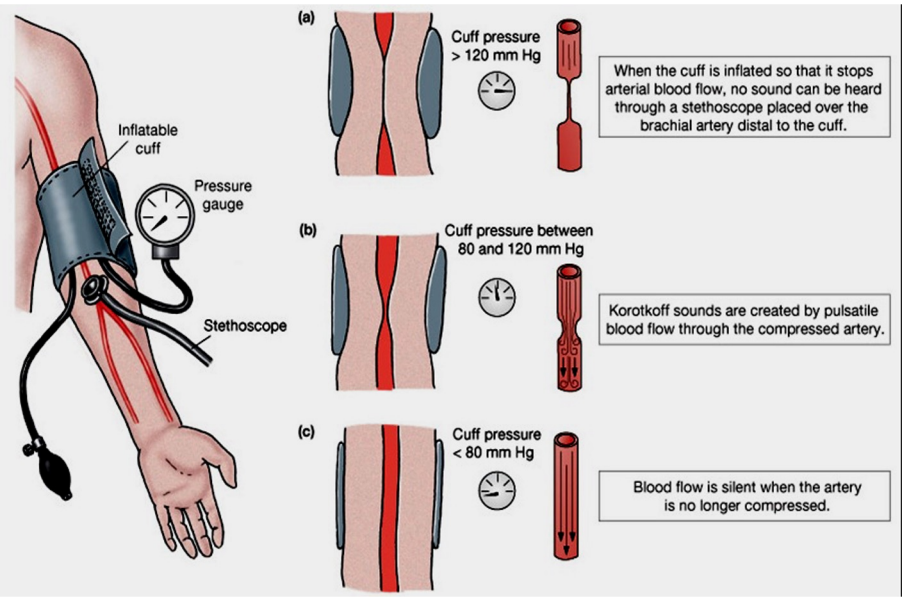
Non-invasive measurement of BP:



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Normal Values:

In healthy adults:

- The average SBP is **100–130 mm Hg.**
- The average DBP is **60–80 mm Hg.**

In children:

- It is **~100/60 mm Hg.**

In the elderly:

- It is **~140/90 mm Hg**

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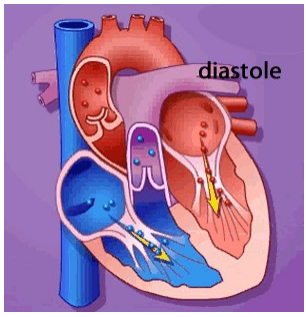
Pulse Pressure:

Pulse Pressure: is the difference between the SBP and DBP.

PP=30–60 mm Hg.



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Factors that influence BP:

Physiological factors affecting BP are:

- **Age.**
- **Sex.**
- **Sleep.**
- **Body built.**
- **After meals.**
- **After exercise.**
- **Emotional conditions.**

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Physiological Variations in BP:

- BP is slightly lower in women than men.
- During sleep, SBP is less.
- Persons with slender build have got a lower BP than those of heavy build.
- BP is also increased after meals.
- Muscular exercise causes an increase in the BP.
- Emotional excitement causes an increase in the BP.

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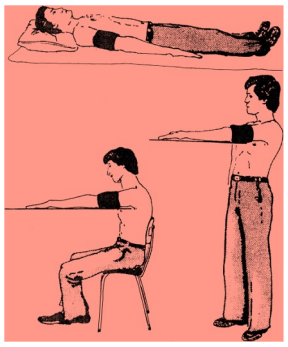
Physiological Variations in BP:

- **The BP, especially the DBP, is:**
  - highest in the standing position,
  - lower in the sitting ,
  - lowest while the subject is lying down.



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Questions/Comments

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