



Blood pressure assessment

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Blood Pressure

- Blood Pressure is the force that blood exerts against blood vessel walls.
- There are **2 types** of **blood pressure**: Systolic (**Contraction**) & Diastolic (**Relaxation**).
- There are **2 types** of **blood flow**: Laminar **or** Stream line & Turbulent.
- **The Laminar flow is the normal flow and it *doesn't* create sound.**
- **The Turbulent flow will create sound** , because the blood flows violently.

Unit of Measurement: **mmHg**



Checking Blood Pressure

- The **Mean Pressure** can be calculated by the next equation:

$$\text{Mean Pressure} = \text{Diastolic BP} + 1/3 \times \text{Pulse Pressure}$$

- **Pulse Pressure** can be calculated as following: **Systolic BP-Diastolic BP**

What is Mean Arterial Blood Pressure ?

- It is the average pressure which drives the blood forward in the tissues (through blood vessels) throughout the cardiac cycle.



- **Systolic pressure** is the maximum pressure exerted by the blood against the artery walls. It results when the ventricles contract. Normally, it measures **120 mmHg**.
- **Diastolic pressure** is the lowest pressure in the artery. It results when the ventricles are relaxed and is usually around **80 mmHg**.
- The BP is the product of the **Cardiac Output (CO)** and **peripheral resistance (PR)**.
- So increase in **CO** leads to increase the Systolic Blood Pressure (SBP) whereas increase in **PR** leads to increase the DBP.

$$BP = CO \times PR$$



Factors affecting BP:

- ✓ Age, Gender
- ✓ Posture
- ✓ Exercise
- ✓ Anxiety or Stress
- ✓ Sleep



Blood Pressure Measurement

- We can measure the arterial blood pressure by the

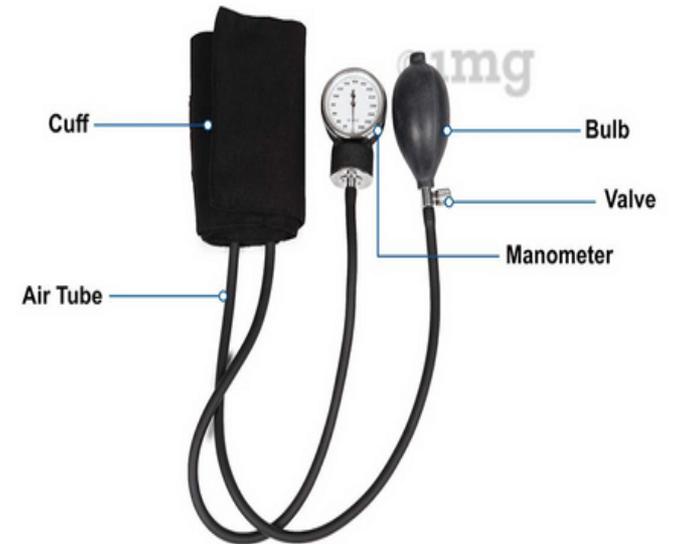
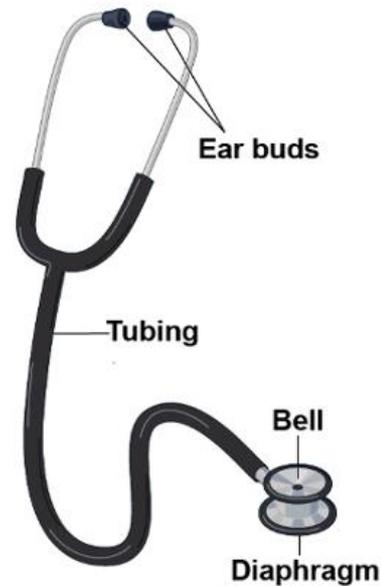
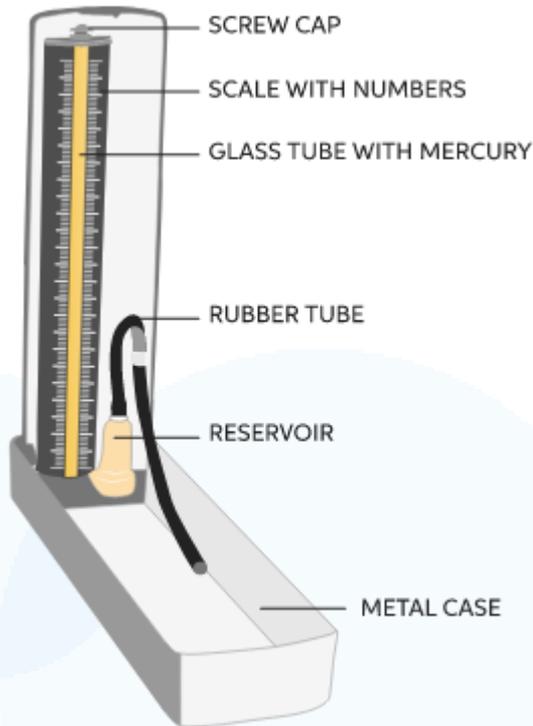
Sphygmomanometer with or without Stethoscope.

- The Sphygmomanometer has 3 types:

1- Mercury Sphygmomanometer.

2- Aneroid Sphygmomanometer.

3- Digital Sphygmomanometer.



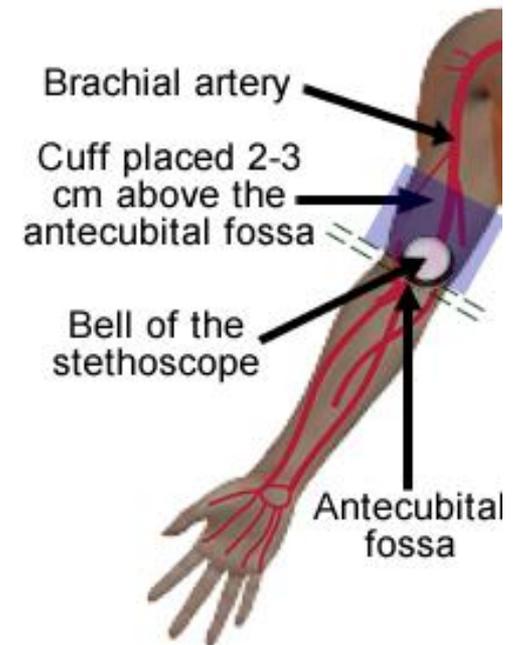
- ❖ The diaphragm: for high-pitched sounds
- ❖ The bell: for low-pitched sounds.
- ❖ The Korotkoff sounds are accepted to be low-pitched sounds



Location of measurement

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- The standard location for blood pressure measurement is the **brachial artery**
- It is important to realize that systolic and diastolic pressures vary substantially in different parts of the arterial tree with systolic pressure increasing in more distal arteries, and diastolic pressure decreasing.



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ABP Measurement Methods

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- There are 2 methods to measure ABP:

1- Palpation:

Measure only the systolic blood pressure, **without** the **stethoscope** by **palpation** the

Radial pulse in the **Radial Artery**.

2-Auscultation:

Measure the both **systolic** & **diastolic** blood pressure, **with** the **stethoscope** by

auscultating the Brachial pulse in the **Brachial Artery**.

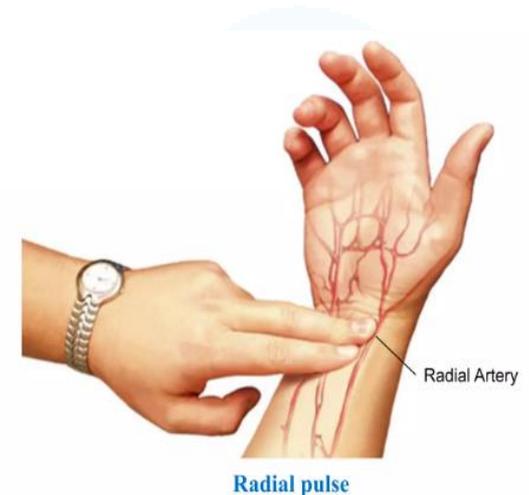


Procedure

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Palpatory method:

1. Allow the patient to relax for 15 to 20 minutes before taking BP.
2. Support the arm horizontal **at heart (mid-sternal) level.**
3. **Wrap** the blood pressure cuff evenly around the *patient's* arm above the antecubital fossa for an accurate reading, **and localize radial pulse.**
4. **Inflate** the BP cuff until a level which is about 20-30 mmHg above the point at which the pulse is no longer palpable.
5. Now slowly deflate the cuff 2 mm/sec until the pulse is palpable again. **This is the systolic BP.**
 - In this method only the systolic pressure can be measured, while the diastolic pressure cannot be measured

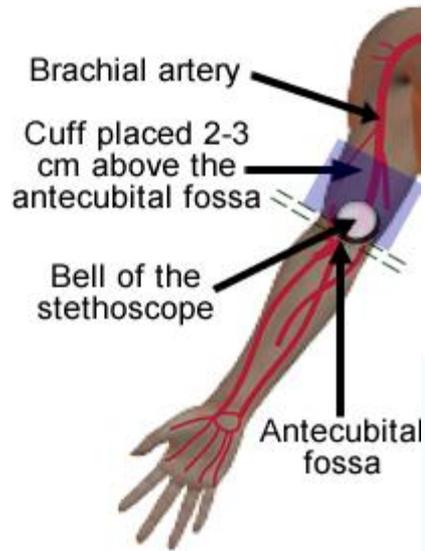




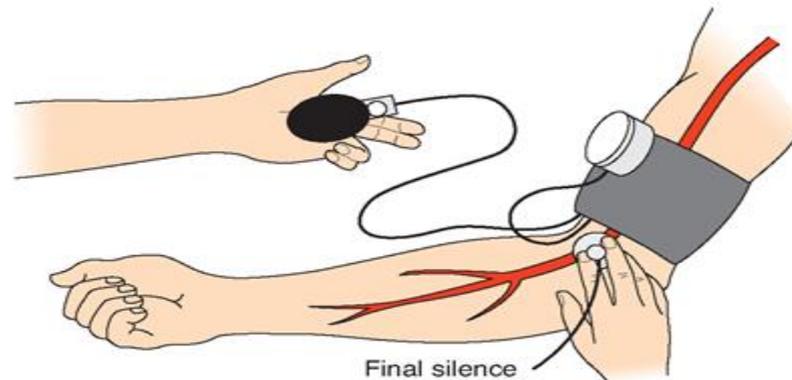
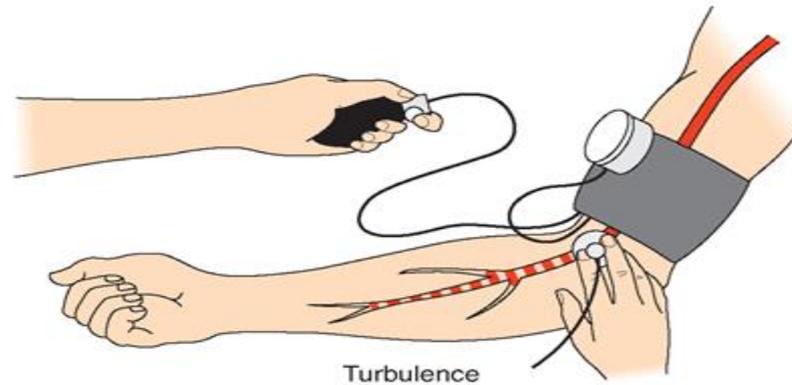
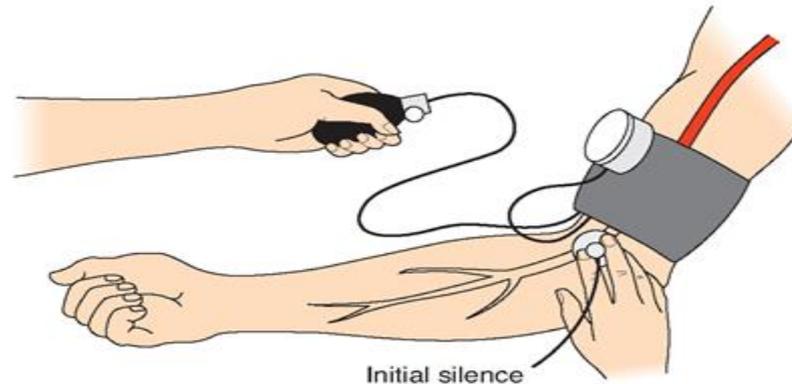
Auscultatory method

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1. Place the bell of the stethoscope over the brachial artery at this location to get the strongest pulse sounds.
2. Inflate the cuff quickly to a pressure about 30 mmHg higher than the systolic pressure determined by the Palpatory method.
3. Deflate the cuff by opening the valve, the air is let out of the cuff slowly and listen to the sound.
4. The pressure at which the **first tapping sound** is heard represents **systolic blood pressure**.
 - The blood will be able to flow through the artery and will create a turbulent flow. This turbulent flow will create sharp sounds
5. Continue to deflate until the point at which the **sounds disappear**. This point marks the **diastolic pressure**.
 - ☐ When the cuff pressure decreases and is unable to keep the brachial artery closed turbulence flow is reduced and we will have laminar flow.



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The **Korotkoff sounds** are the loud thumping sounds you'll hear through the stethoscope while deflating the sphygmomanometer.

- **Systolic blood pressure** is indicated by the first Korotkoff sound that is heard.
- **Diastolic blood pressure** is indicated after all Korotkoff sounds have been heard through the stethoscope and then disappear.

