

systole of ventricles mercury column in 40 mm Hg higher than diastole and this denotes pulse pressure (PP) which depicts difference between SBP and DBP i.e.  $120 - 80 = 40$ . The SBP (systolic) blood pressure minus DBP (diastolic blood pressure) is clinically expressed as SBP/DBP i.e. 120/80.

- (10) After taking blood pressure unwrap the cuff and close the B.P. apparatus.
- (11) In case rise of systolic blood pressure than 120 mm Hg or decrease of diastolic blood pressure or increase of diastolic blood pressure consult the physicians for advice and consequent treatment. By treatment and precautions blood pressure becomes normal.

**Precautions for taking blood pressure :** Check the B.P. instrument regularly for any leakage in air pressure in cuff or rubber bulb.

- (1) While taking blood pressure, the palm of the patient should always be upwards.
- (2) The brachial artery above the elbow should be palpated correctly before placing the chest of the stethoscope over the angle of the elbow.

slide. Start the stop watch. Keep on checking the drop by a needle constantly and as soon as fibrin appears stop the stop watch. The time taken by the blood to form fibrin is called as clotting time.

**Experiment (12) : To determine the blood pressure of man.**

**Concept and significance :** The word B.P. (Blood pressure) is very familiar to educated, uneducated, poor or rich people because of the fear associated with B.P. regarding the headache and hypertension. Generally older persons have to take B.P. medicines.

When the blood flows through the blood vessels it exerts lateral pressure on the wall of the blood vessels and this pressure is called as **blood pressure**. Blood is pumped by the heart into blood vessels through arteries and capillaries up to the cell. The blood is collected back into the heart called as venous blood for purification. Our four-chambered heart is composed of two auricles and two ventricles.

The heart regularly beats. It contracts and then relaxes mediated by the ventricular muscles. The contraction phase is called a systole and relaxation phase is called as diastole which constitutes cardiac cycle (S/D).

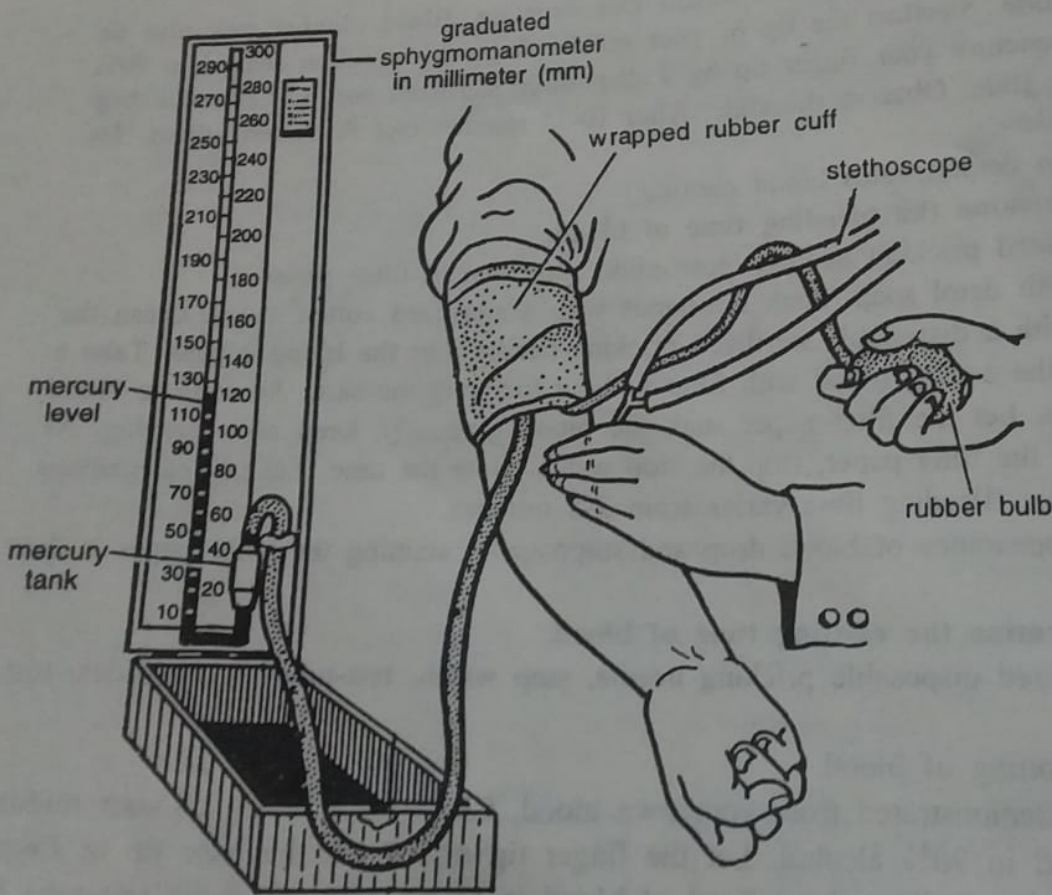


Fig. 19. Sphygmomanometer, for measuring arterial blood pressure.

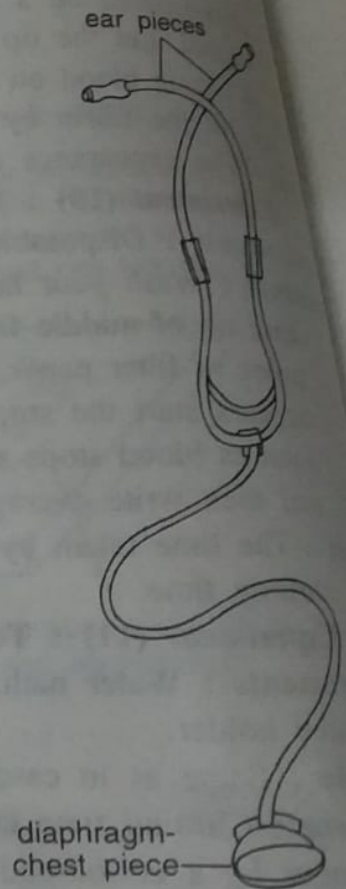


Fig. 20. Stethoscope.

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Fig. 19. Sphygmomanometer, for measuring arterial blood pressure.

The significance of blood flow to maintain sufficient pressure for the flow of blood through the blood vessels. The blood pressure also provides the motive force of filtration at fine capillary beds and thus assuring regular nutrition to the tissues, cells, urine formation and proper working of lymphatic, immune and blood vascular systems. The cardiac cycle and blood pressure are regulated by myogenic regulators and neural control by neurotransmitters. Some vital organs like heart, kidney and brain have auto regulation for blood flow. Stress and diseases cause changes in blood pressure. The blood pressure is measured by a B.P. instrument called as sphygmomanometer (Fig. 19). The apparatus consists of a graduated column in millimeter (mm) in a hollow glass-tube attached to mercury tank, a rubber-cuff connected by a tube to a rubber bulb for pumping air and a stethoscope containing ear pieces and chest or diaphragm (Fig. 20).

The blood pressure was first measured in horse by Hales : S (1733). The blood pressure in man is measured by brachial artery of the arm which supplies blood to the arm. Since the blood is pumped by heart in a rhythmic cycle hence blood pressure is highest during **systole** (contraction) and lowest at **diastole** (relaxation). The systolic pressure is called as upper limit which is 120 to 135 mm Hg. The B.P. of a healthy youngman is 120/80 mm Hg.

The exercises and morning walk help in maintaining normal level of B.P. The emotions, excitement, diseases, food, body posture and constriction of blood vessels increase or decrease in blood pressure.

**Principle of measuring B.P. :** The blood pressure is measured from **brachial artery** by mercury sphygmomanometer or by Arenoid digital monometer (Fig. 21). The blood pressure apparatus makes it possible to measure the amount of air pressure in cuff of apparatus equal to the blood pressure in brachial artery. The measurement is made in terms of how many millimeters high the air pressure raises in column of mercury in a graduated glass tube of sphygmomanometers.

Fig. 21 Digital sphygmomanometer (Aneroid)

**Procedure :** Follow the following procedure

- (1) The person whose blood pressure is to be measured may be seated on chair by the side of a doctors table.
- (2) Stretch the left hand on the table with palm upwards. Ask the person to close the palm as shown in figure 21.
- (3) Wrap the rubber cuff around the arm above the elbow over the brachial artery.
- (4) Feel the pulse above the elbow and insert the chest (diaphragm) of the stethoscope just above the pulse place under rubber cuff.
- (5) Attach rubber-cuff to a compressible rubber-bulb through tube. Hold the rubber bulb in your right hand.
- (6) Compress the rubber bulb very gently and gradually to exert air pressure against outside brachial artery.
- (7) Keep on gradually pumping the air until the air pressure exceeds the blood pressure within the brachial artery or in other words starts compressing the brachial artery. At such point no pulse is heard through the chest of the stethoscope kept at the brachial artery above elbow along the inner margin of the bicep's muscle.
- (8) Now very slowly release the air pressure in the cuff around the arm to decrease the pressure until it is approximately equal to blood pressure in the brachial artery. At this juncture small gush of blood comes out in the artery. The sudden flow of blood is marked by a sound "dup". This is followed by increasing louder sound by the flow of blood in the arteries. After sometimes the sound disappears with a last sound like "lup" and then no sound appears. The physicians and nurses or any other person taking blood pressure must be very trained to detect above sounds "dup" and "lup" for correct measurement of the blood pressure.
- (9) It is to be kept in mind that the systolic pressure gives the important information of the force of the left ventricular contraction and diastolic (relaxation) indicates resistance of the walls of blood vessels. It also depicts the condition of peripheral blood vessels. The blood in the arteries of normal adult exerts a pressure equal to that required to raise a column of mercury approximately 120 mm high in a glass tube during systole of ventricles and 80 mm during diastole of ventricles. During