جامعه المعقل الاهليه /كليه طب الاسنان

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Pressure

Pressure is defined as the force per unit area

P=F/A= N/m^2

F IS force   unit N , A is area unit m^2

- ➤   SI unit for pressure is Pascal. 1 Pa = 1 N/m^2
- ➤   Standard atmospheric pressure at sea level, 1 atm = 101.3 kPa
- ➤   Many different units are used to measure pressure:
- mm Hg (millimeters of mercury) for blood pressure
- Pa (Pascals) for scientists and engineers

fluid pressure(liquid and gas)

- The pressure in a fluid at rest varies with depth h in the fluid according to the expression

- P = Po + ρgh   (1)

- ρ : the density of liquid for mercury ρ =13.6 g $/cm^3$

- g : the acceleration due to gravity, h : the height of the column ,Po atmospheric pressure Po 1.00 atm 1.013 x10^5 Pa

- Equation (1)   implies that the pressure is the same at all points having the same depth, independent of the shape of the container.

Measurement of Pressure
open-tube manometer
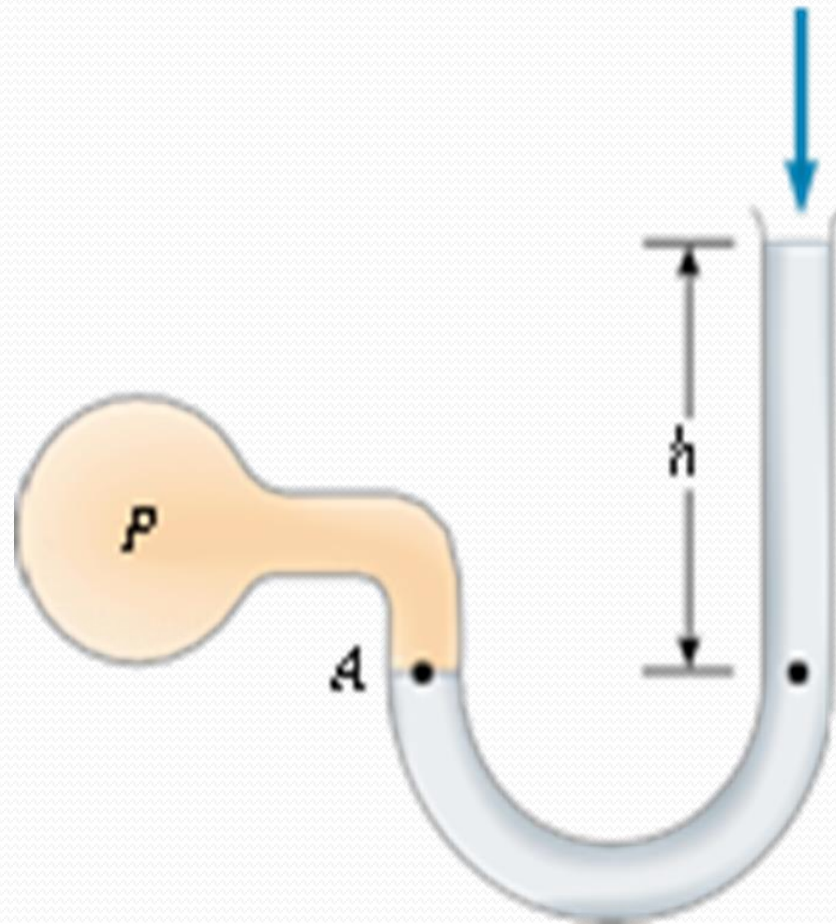
Measurement of Pressure

1- open-tube manometer

- One simple device for measuring pressure is the open-tube manometer illustrated in Figure 1. One end of a U-shaped tube containing a liquid is open to the atmosphere, and the other end is connected to a system of unknown pressure P. The difference in pressure is equal to ρgh; hence, $P = Po + ρgh$ The pressure P is called the absolute pressure, and the difference $P - Po$ is called the gauge pressure. The latter is the value that normally appears on a pressure gauge. For example, the pressure you measure in your bicycle tire is the gauge pressure

Measurement of Pressure 2-Barometer

- Another instrument used to measure pressure is the common barometer, which was invented by Evangelista Torricelli (1608–1647). The barometer consists of along, mercury-filled tube closed at one end and inverted into an open container of mercury (Fig. 15.8b). The closed end of the tube is nearly a vacuum, and so its pressure can be taken as zero. Therefore, it follows that $P_0 = \rho g h$ where h is the height of the mercury column.

barometer
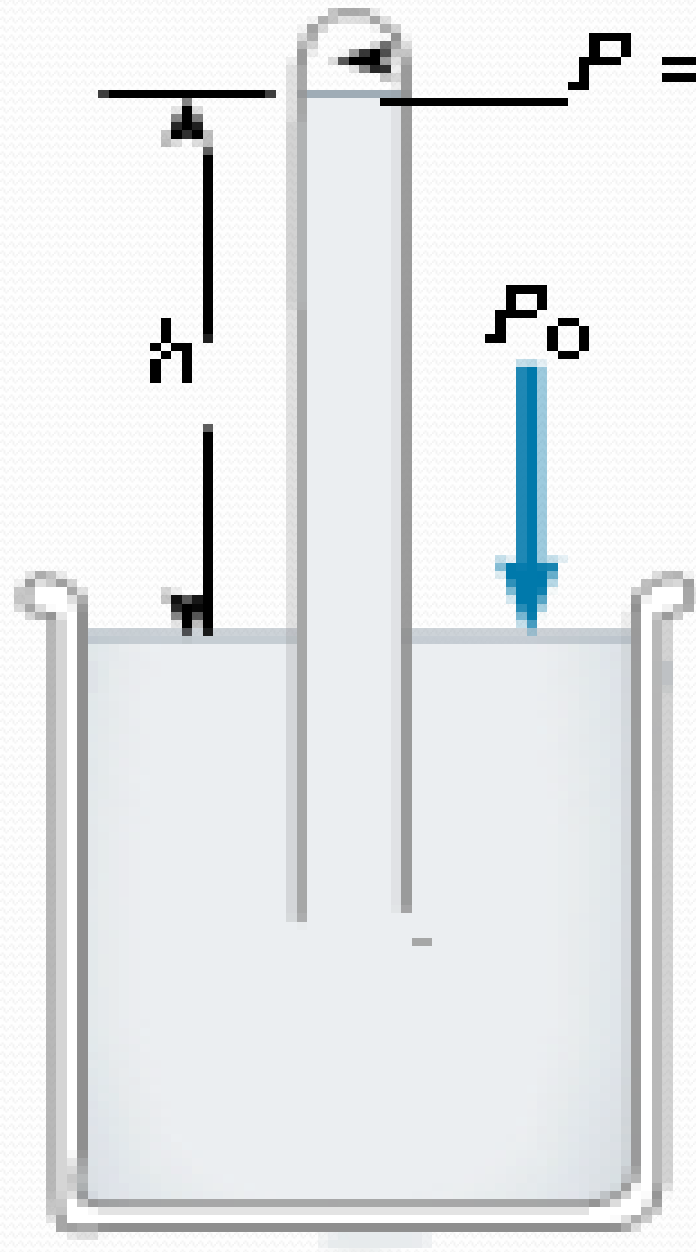
Blood pressure and Pulse rate

- Blood pressure ; The force exerted by the blood on the walls of the arteries (and veins) as the blood is pumped around the circulation.

- Measured in units of mmHg.

- Pulse rate
  The normal pulse for healthy adults ranges from 60 to 100 beats per minute. The pulse rate may fluctuate and increase with exercise

- How to check your pulse

- You feel the beats by firmly pressing on the arteries, which are located close to the surface of the skin at certain points of the body.
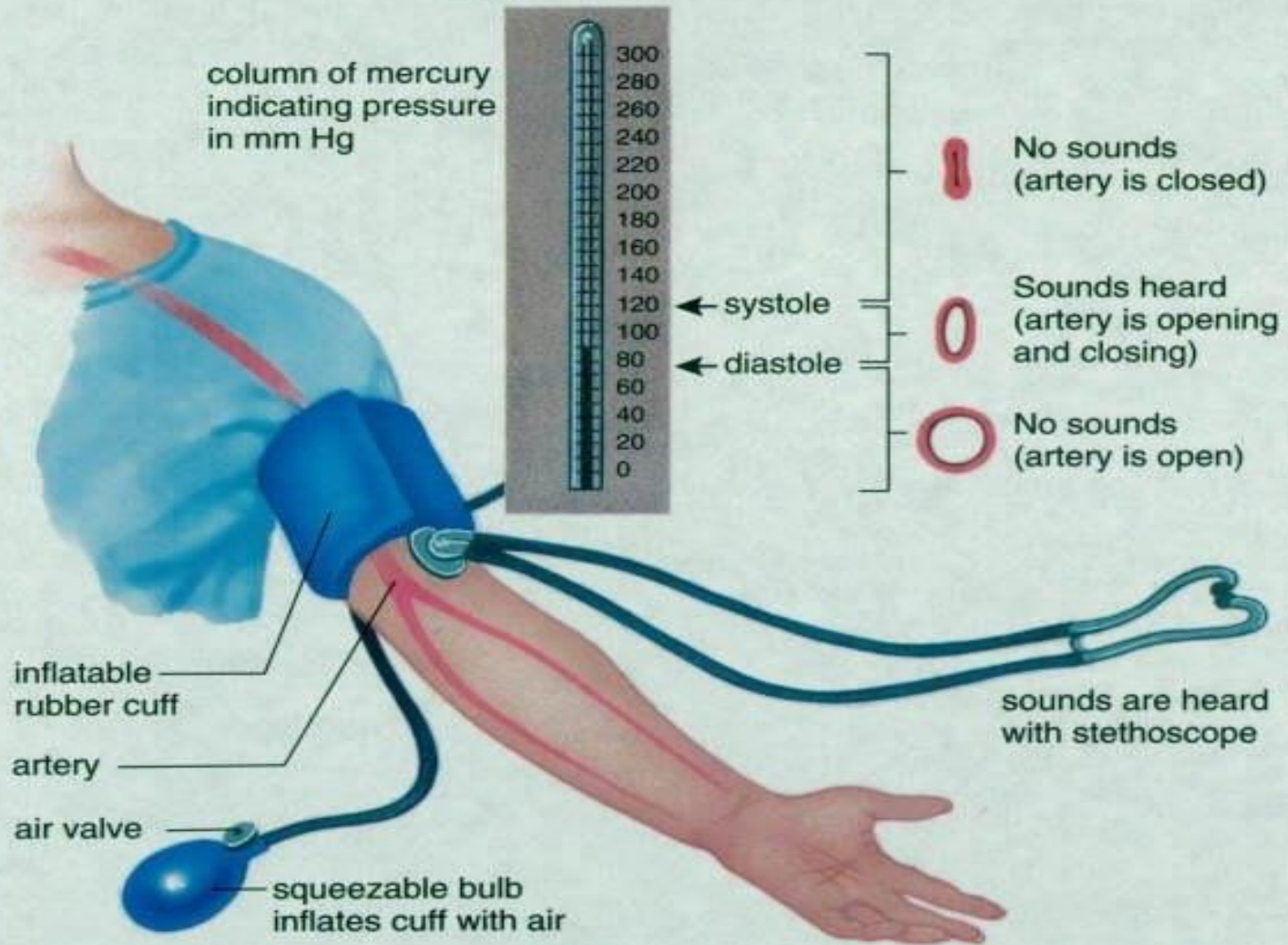
blood pressure measurement sphygmomanometer

- A sphygmomanometer is an instrument used to measure blood pressure which is also known as Mercury sphygmomanometer or blood pressure gauge or blood pressure monitor. The word sphygmomanometer is derived from the Greek word 'sphygmos' meaning beating of the heart or the pulse and manometer means the device used for measuring the pressure or tension. This instrument was invented by Samuel Siegfried Karl Ritter von Basch in the year 1881. But in the year 1896, Scipione Riva-Rocci introduced a simple version of the sphygmomanometer.

Parts of sphygmomanometer

- A sphygmomanometer has three parts:
- a cuff that can be inflated with air, with squeezable bulb inflates cuff with air

- a pressure meter (manometer) in, Colum of mercury indicating pressure mmHg

- a stethoscope for listening to the sound the blood makes as it flows through the artery (the major artery found in your upper arm).