

MODULE : 3

MOD: 1 → bioelectric pot

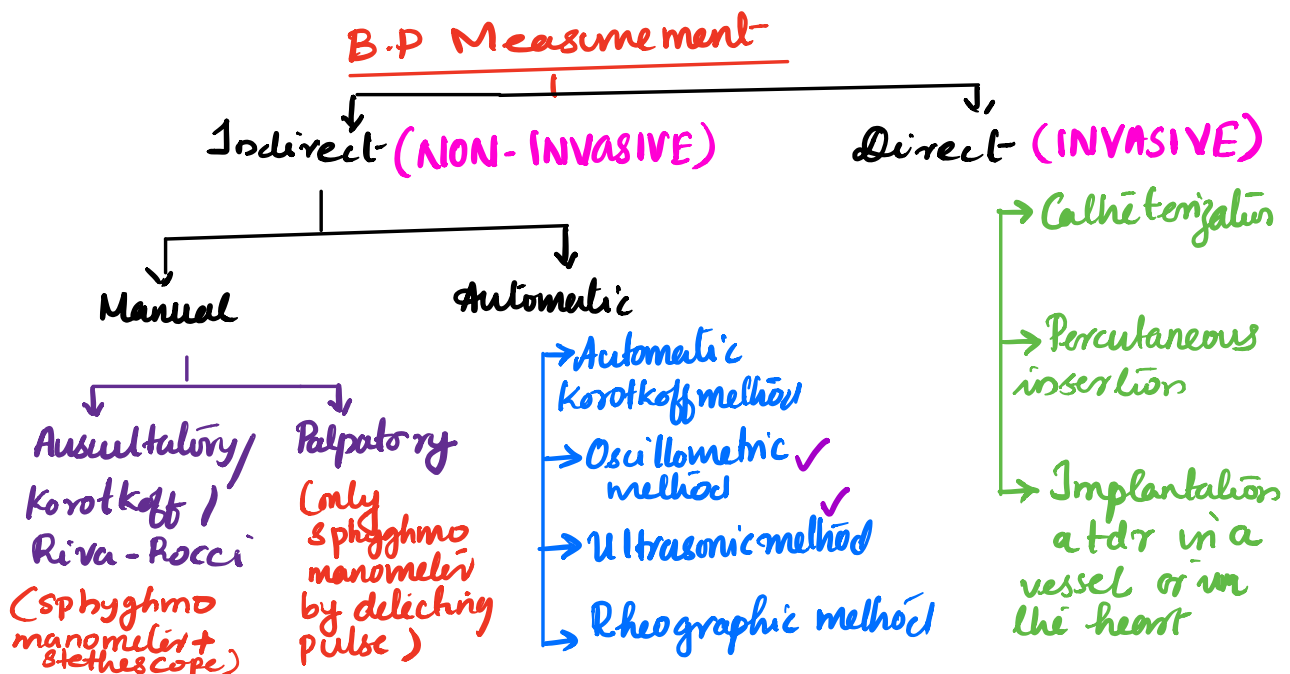
MOD: 2 → electrodes, tdrs, ECG

- B.P measurement methods
- Blood flow measurement-
- Cardiac output measurement-
- Plethysmography (measurement of vol. changes in diff. parts of the body)
- Phonocardiography (measurement of heart sound)

Blood Pressure :- Pressure of blood flows in the blood vessel

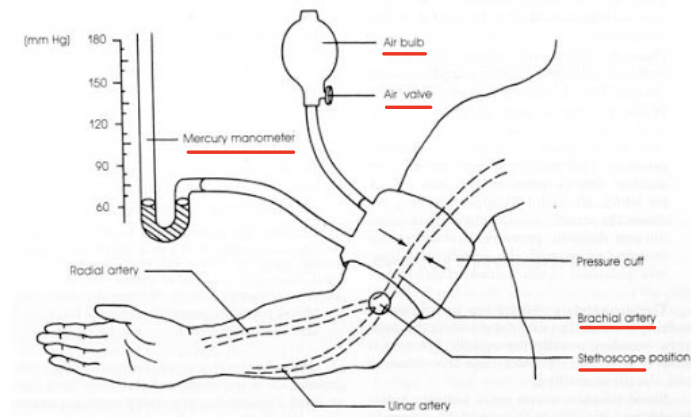
* **Systolic Pressure** - Max. Pressure - contraction of ventricular muscles
(120mm Hg - 140mm Hg)

* **Diastolic Pressure** - Min. Pressure - ventricular relaxation
(60mm Hg - 80mm Hg)

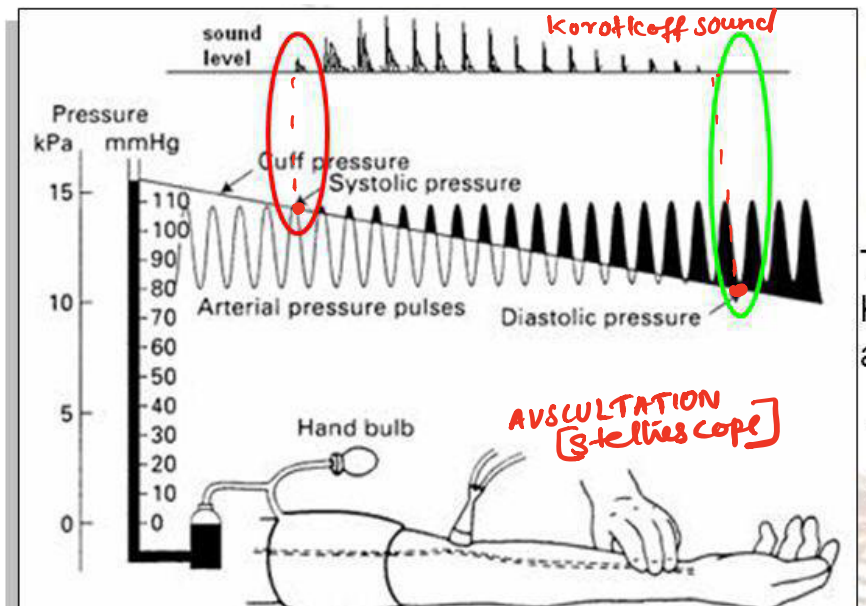


1. Auscultatory method (Riva-Rocci / Korotkoff)

Sphygmomanometer



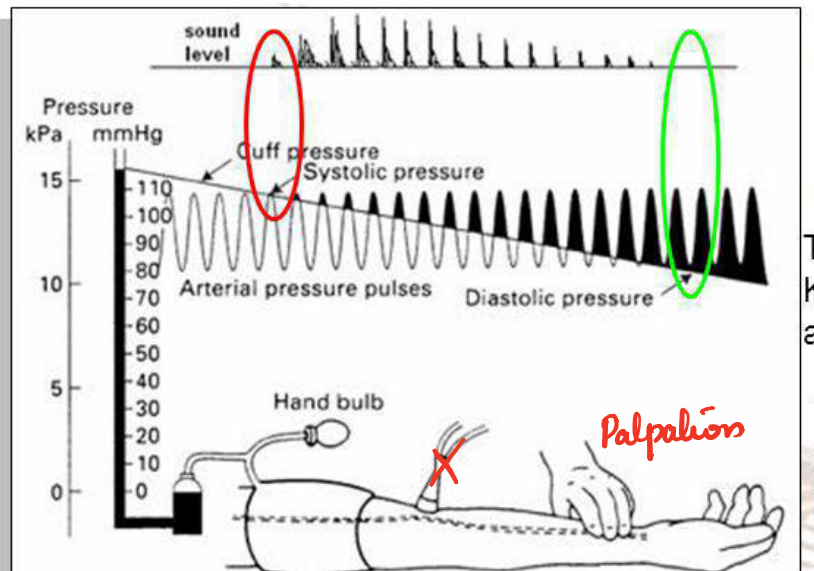
Blood flow sounds are called Korotkoff's sound



Cuff Pressure > Systolic Pressure
 ↓
 Valve open
 ↓
 Cuff Pressure ↓
 ↓
 Blood begins to flow
 ↓
 audible sound (Korotkoff sound) **Systolic Pressure**
 ↓
 Cuff Pressure < diastolic Pressure
 sound stops (**diastolic Pressure**)

2. Palpatory method

- by detecting pulses.



3. Oscillometric BP measurement (Indirect - Automatic)

pressure > systolic pressure



artery walls oscillate

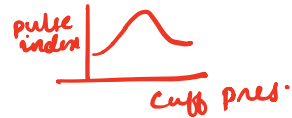


vibrations are sensed in the tdr.



BP values using Oscillometric pulse index

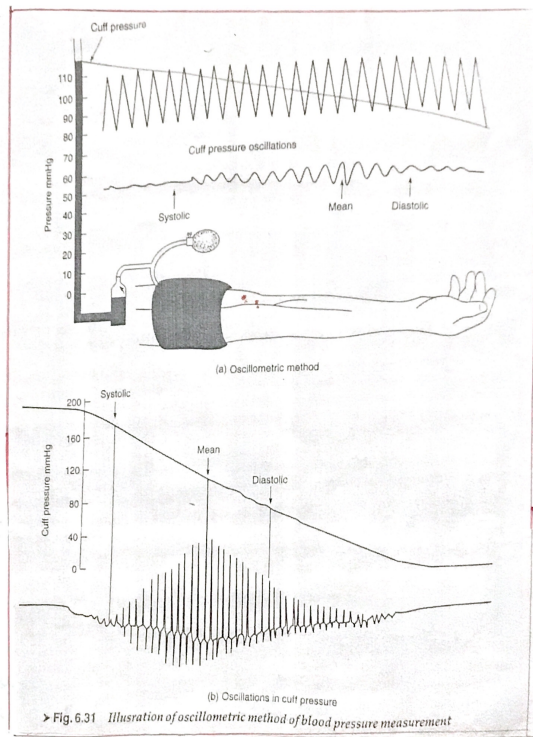
2 criteria

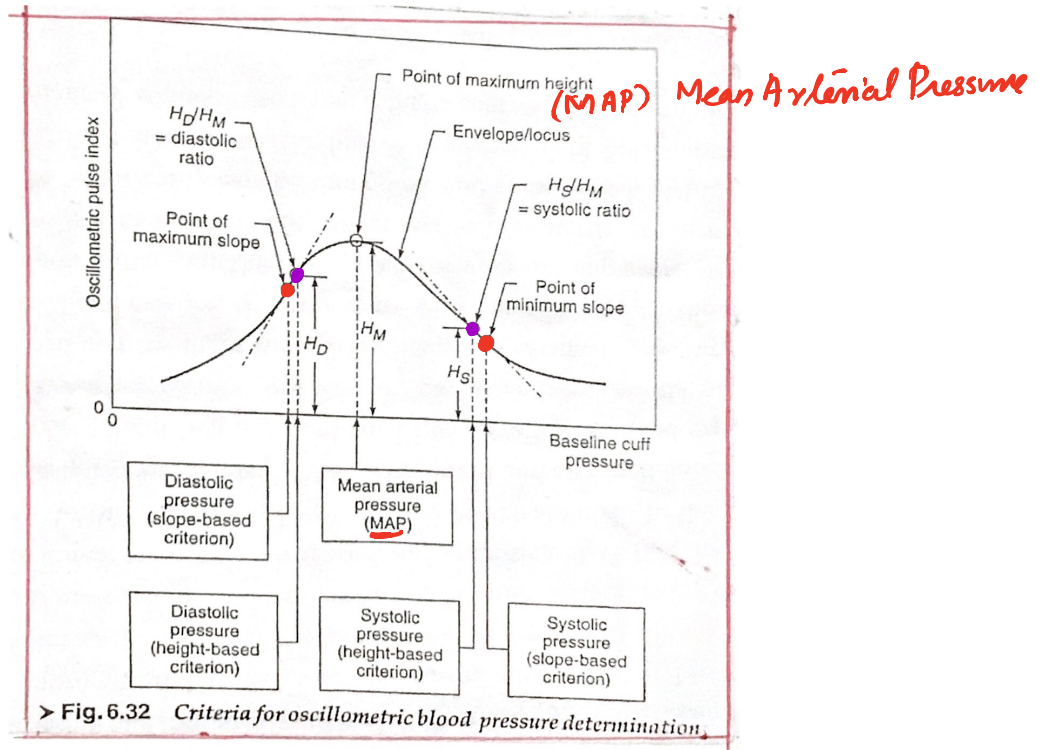


HT based



slope based





Advantages :-

1. Since sound is not used to measure BP in the oscillometric technique, high environmental noise levels such as those found in a busy clinical or emergency room do not hamper the measurement.
2. Placement of cuff is not as critical as it is with auscultatory method.

Disadvantage :-

1. Excessive movement or vibration during the measurement can cause inaccurate readings or failure to obtain any reading at all.

4. Ultrasonic Doppler Shift method

Doppler effect :- txtd wave freq differ from received freq.

$$\Delta f = \frac{2v_t}{\lambda_c}$$

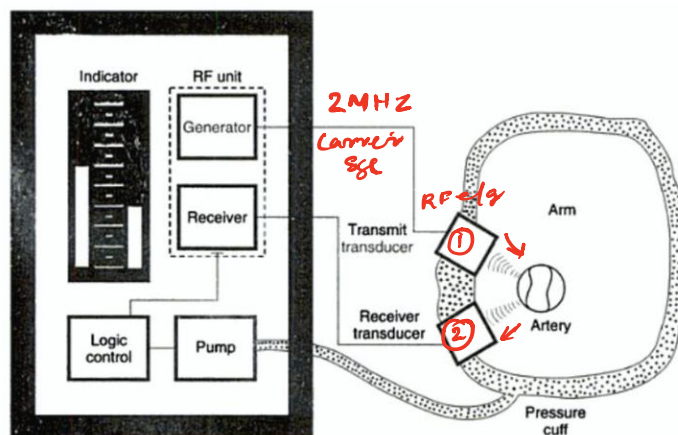
$$\Delta f \propto v_t$$

$\Delta f \rightarrow$ Doppler freq.

$v_t \rightarrow$ Brachial artery velocity

$\lambda_c \rightarrow$ carrier wave length

Ultrasonic Doppler shift method:



No motion/ vibration $\rightarrow \Delta f = 0$

if vibration $\Rightarrow \Delta f \Rightarrow$ detected and decoded.

⊛ $>$ Syst. Pressure, \Rightarrow Vessel closed \Rightarrow no sigs are received, $\Delta f = 0$

⊛ $@$ syst. pressure \Rightarrow artery wall snaps open \Rightarrow 1st Korotkoff sound, Δf .

↓ similar Δf
is produced
until diast
pressure.

⊛ $@$ diastolic pressure \Rightarrow sudden \downarrow series Δf .