Arterial blood pressure estimation

3rd Practical Lect.

2nd Term

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Arterial blood pressure

Blood pressure is the force exerted by blood against a vessel wall.

It maintains blood flow through capillaries.

It depends on blood volume & compliance (destinsibility) of blood vessels.

Arterial BP is not constant, it rises during ventricular systole (contraction) & falls during ventricular diastole (relaxation).

Systolic BP

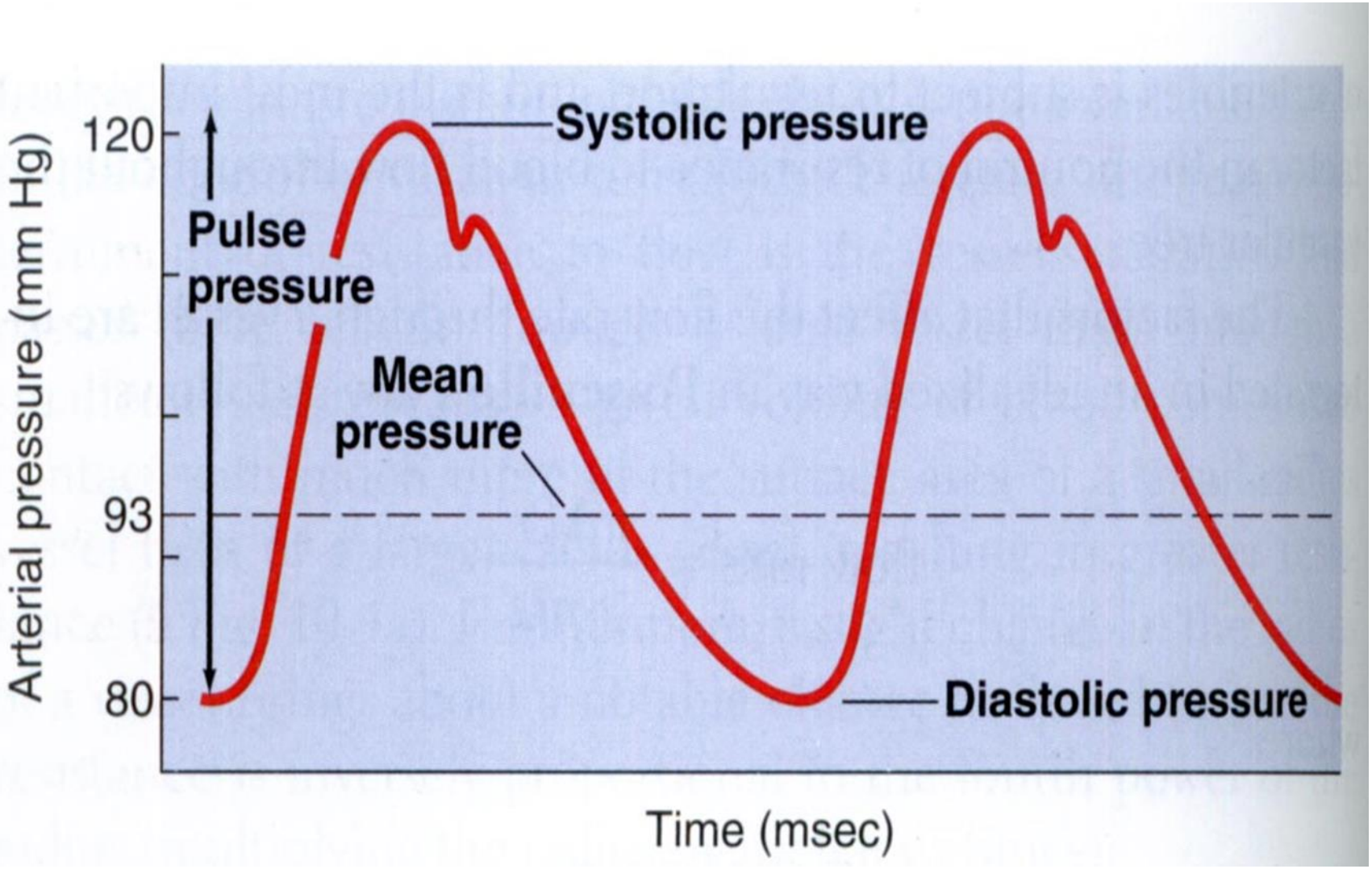
Is the peak (highest) BP measured during ventricular systole = 120 mmHg, in a young Person at rest.

Diastolic BP

Is the minimum B.P. at the end of ventricular diastole = 80 mmHg, in a young person at rest.

Pulse pressure

Is the difference between systolic and diastolic BP


Arterial pressure (mm Hg)
120
93
80
Systolic pressure
Pulse pressure
Mean pressure
Diastolic pressure
Time (msec)

Mean BP

Calculated by adding one-third of the pulse pressure to the diastolic BP.

If BP = 120/90 mmHg.

The mean BP = 90 + $\frac{120 - 90}{3}$

= 90 + 10 = 100 mmHg.

Mean arterial BP = C.O. x total peripheral resistance.

C.O. determines systolic BP.

Total peripheral resistance determines diastolic BP.

Blood Pressure Must Be Regulated

- **Low Blood Pressure**

  Blood will not reach all Tissues specifically those Where gravity is acting against flow.

  Most importantly the brain.

- **High Blood Pressure**
  - **Heart is placed under great stress**
  - **Excess plasma leakage**
  - **At the extreme, capillaries burst**

Physiological variations in BP

- Age
- Sex
- Body mass index
- Meals
- Exercise
- Posture
- Anxiety
- ↓ Slightly during inspiration and ↑ Slightly during expiration

Determinants of arterial BP

- Total peripheral resistance (TPR)
- Cardiac output (CO)
- Blood viscosity.
- Blood volume.

Arterial BP = CO X TPR