

DETERMINANTS OF ARTERIAL

BLOOD PRESSURE

INTRODUCTION:-

* Blood Pressure $\Rightarrow$ Lateral Pressure exerted by circulating blood on wall of blood vessel.

Systolic BP $\Rightarrow$ Maximum pressure exerted by blood on vessel walls during contraction of heart chambers

Diastolic BP $\Rightarrow$ Minimum pressure exerted by blood on vessel walls during relaxation of heart chambers

Normal resting BP = Systolic BP (90-120 mmHg)
Diastolic BP (60-80 mmHg)
(Adults)

Pulse pressure $\Rightarrow$ Difference between Systolic BP & Diastolic BP
Pulse press. = SBP - DBP (Normal :- 30-40 mmHg)

Mean Arterial press $\Rightarrow$ Average press. over a cardiac cycle

$$MAP = DBP + \frac{1}{3}(PP)$$

(Normal :- 90-100 mmHg)

DETERMINANTS

② PR (Peripheral Resistance)

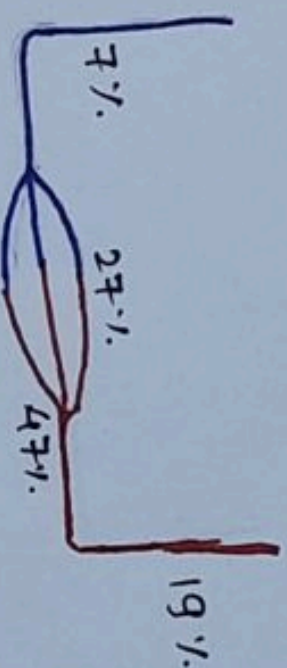
$$\text{Arterial BP} = \text{CO} \times \text{PR}$$

① $\text{C.O.} = \text{HR} \times \text{SV}$

① C.O. :- $\uparrow \text{C.O.} \Rightarrow \uparrow \text{Blood entering} \Rightarrow \uparrow \text{BP}$
circulation

② PR :- • Distribution of PR

- Arteries = 19%
- Arterioles = 47%
- Capillaries = 27%
- Veins = 7%



• Factors regulating TPR :-

- Size of lumen of BV $[R \propto 1/d^4]$
- Velocity of flow $[R \propto \frac{1}{F}]$
- viscosity of Blood $[R \propto \eta]$

③ Viscosity of blood:-

viscosity $\propto$ BP

↳ Determined mainly by Hematocrit & proteins

④ Blood volume:-

B.V. $\uparrow$ $\rightarrow$ venous return $\uparrow$ $\rightarrow$ End diastolic vol. $\uparrow$

B.P. $\uparrow$ $\leftarrow$ Force of contraction $\uparrow$

⑤ Elasticity of Blood vessels:-

Loss of elasticity

$\downarrow$

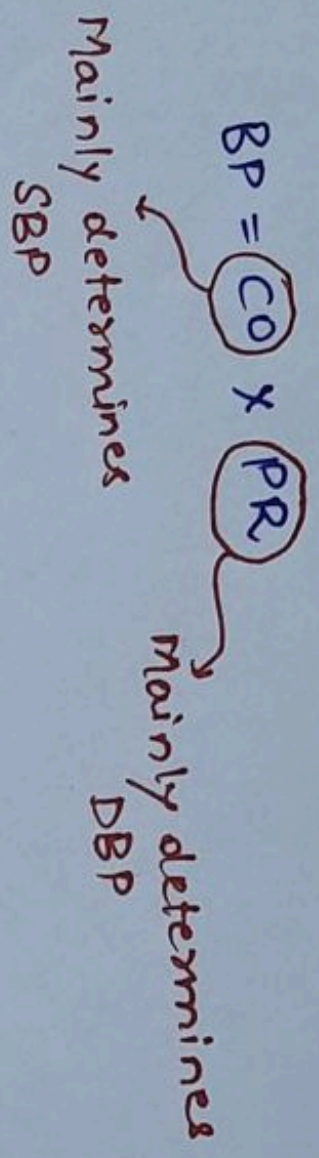
Loss of windkessel effect

$\downarrow$

$\uparrow$ BP

CONCEPTS :-

1.) During strenuous exercise



during stren. exercise

$CO \uparrow$ & $PR \downarrow$
(d/t vasodilation)

↓ therefore

SBP $\uparrow$ and DBP $\downarrow$

II.) Vascular distensibility

$$VD = \frac{\uparrow \text{ in volume}}{\uparrow \text{ in press. } \times \text{ original volume}}$$

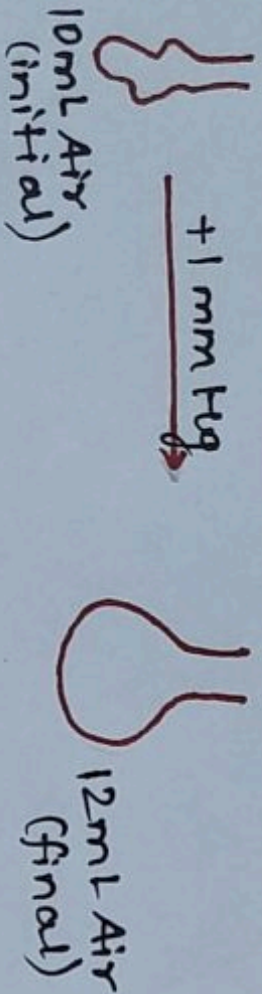
V.D. (veins > Arteries)

III) Vascular compliance / capacitance :-

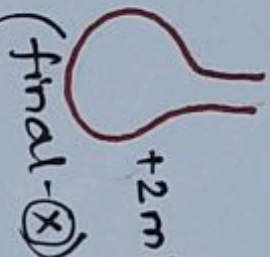
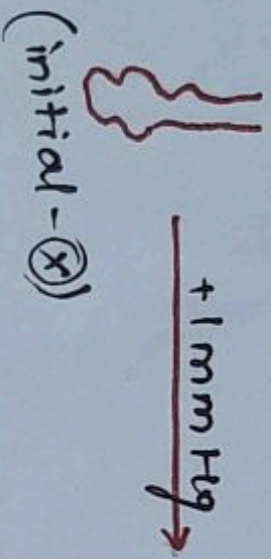
$$= \frac{\uparrow \text{ in volume}}{\uparrow \text{ in pressure}}$$

[veins > Arteries]

Ex



$$VD = \frac{\uparrow \text{ vol.}}{\uparrow \text{ press} \times \text{orig. vol}} = \frac{+2}{+1 \times 10} = 0.2$$

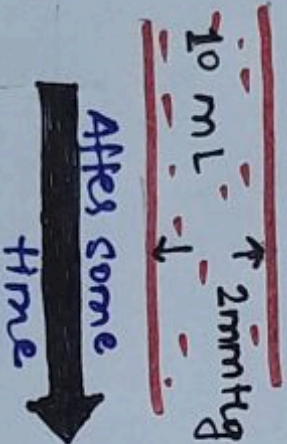


$$VC = \frac{\uparrow \text{ vol.}}{\uparrow \text{ press}} = \frac{+2}{+1} = 2$$

IV) Stress relaxation of vessels (Delayed compliance)

∴ It is important mech. that helps to maintain

(N)BP during massive B.T



Immediate elastic distention of vessel

Smooth muscle fibres begins to 'creep' to longer length

Tension ↓ as