

Myocardial oxygen supply

Is dependent on the oxygen content of the blood and the flow

Oxygen content = $Hb(Sats)1.34 + \text{dissolved oxygen}$

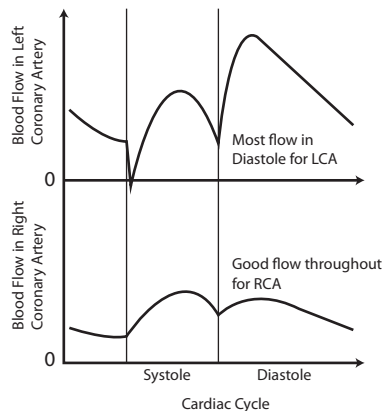
Coronary blood flow is 200-250 ml/min which equals approximately 5% CO

flow = pressure difference/resistance, the heart demonstrates autoregulation

flow is not constant however throughout the coronary system

wall tension in the left ventricle creates a Starling resistor model

during systole blood flow may become retrograde in the LV as a result



During tachycardia

the oxygen content is not significantly changed,

oxygen is perfusion limited

only at extreme tachycardia (pulmonary capillary transit time < 0.3 seconds) will result in changes

Blood flow is significantly affected however

during tachycardia diastole is decreased

therefore there is less filling time and the LV may receive inadequate flow

Myocardial oxygen demand

Dependent on

Wall tension

Heart rate

Contractility

External work

Basal metabolic rate

During tachycardia

by definition increased heart rate will increase demand

myocardial O₂ consumption is very high at 8ml/min/100g, of tissue (up to 20 times skeletal muscle)

extraction ratio is as high as 75%, the heart cannot compensate by extracting more