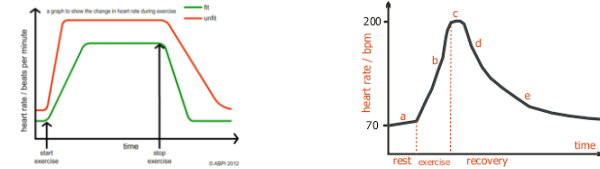




Keywords	
Word	Definition
Starling's law	
Ejection Fraction	
Venous Return	
Vascular Shunt	
Cardiovascular Drift	
Arterio-Venous Oxygen Difference	
Vaso-regulation	
Partial Pressure	
Cardiac Control Centre	
Cardiac Conduction System	
Myogenic	
Partial Pressure	

Key skills	
- Analysis of muscle fibre characteristics to ascertain the fibres functional abilities. - Evaluation of PNF theory	

Cardiovascular Response to Exercise



Sub-Maximal and Maximal Exercise

BEFORE - Anticipatory rise causes heart rate to increase prior to exercise due to the release of adrenaline, which acts on the SAN to increase heart rate.

DURING, maximal - Heart rate rises sharply with anaerobic, maximal work until it reaches maximal heart rate (220-age=MHR). Once fatigue sets in, the performer is forced to stop.

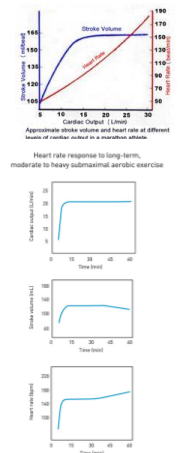
DURING, sub-maximal - Heart rate rises sharply initially with anaerobic work (known as sub-maximal oxygen deficit), however once oxygen demand is met, when working between 40-80% of MHR, heart rate plateaus.

AFTER - There is a rapid decline in heart rate as soon as exercise stops, followed by a slower, more gradual recovery period (Fast and Slow component of EPOC).

Cardiac output is the same **at rest** for trained and untrained performers. For elite athletes maximal cardiac output is far greater than an untrained performer.

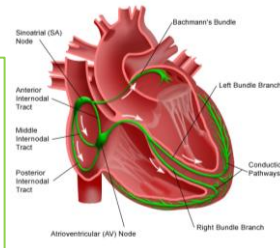
Due to cardiac hypertrophy, resting stroke volume is greater in a trained athlete than an untrained athlete.

Stroke volume plateaus around 40-60% of maximal effort as the ventricles have less time to fill, reducing the pre-stretch of the heart, which decreases the force of contraction and reduces the ejection fraction. Heart rate must increase to compensate.



Cardiac Conduction System

The heart is **myogenic**, it creates its own electrical impulse at the **Sinoartial Node**. A **wave of excitation** spreads across the atria causing **atrial systole**. The impulse is passed to the **Atrio-ventricular node**, here it is delayed for **0.1seconds** for the atria to fully empty and the ventricles to fully fill. The **tricuspid and bicuspid valves** close. The impulse continues down the **bundle of His** and is distributed evenly around the **Purkinje fibres**, causing the ventricles to contract from the bottom up, ejecting blood out through the **semi-lunar valves**.



Venous Return

Oxyhaemoglobin Dissociation Curve

Box 6: Pathway

Previous knowledge: Components of fitness, methods of training, principles of training.

Future links: Specialist training methods.

Careers: Physiotherapy, Sports Therapy, Sports Medicine, Exercise Physiologist.

Box 7: Cross curricular links