

Long and Short Term Effects of Exercise Revision Guide

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Short Term Effects of Exercise

When a person takes part in exercise the **cardiovascular, respiratory, energy and muscular systems** all work together to **supply energy** to the working muscles and removes waste products.



When the muscles start to work, they **need more oxygen** so the **respiratory system responds** by getting more oxygen into the lungs.

The blood carries greater amounts of oxygen and the heart responds to pump more oxygenated blood around the body.

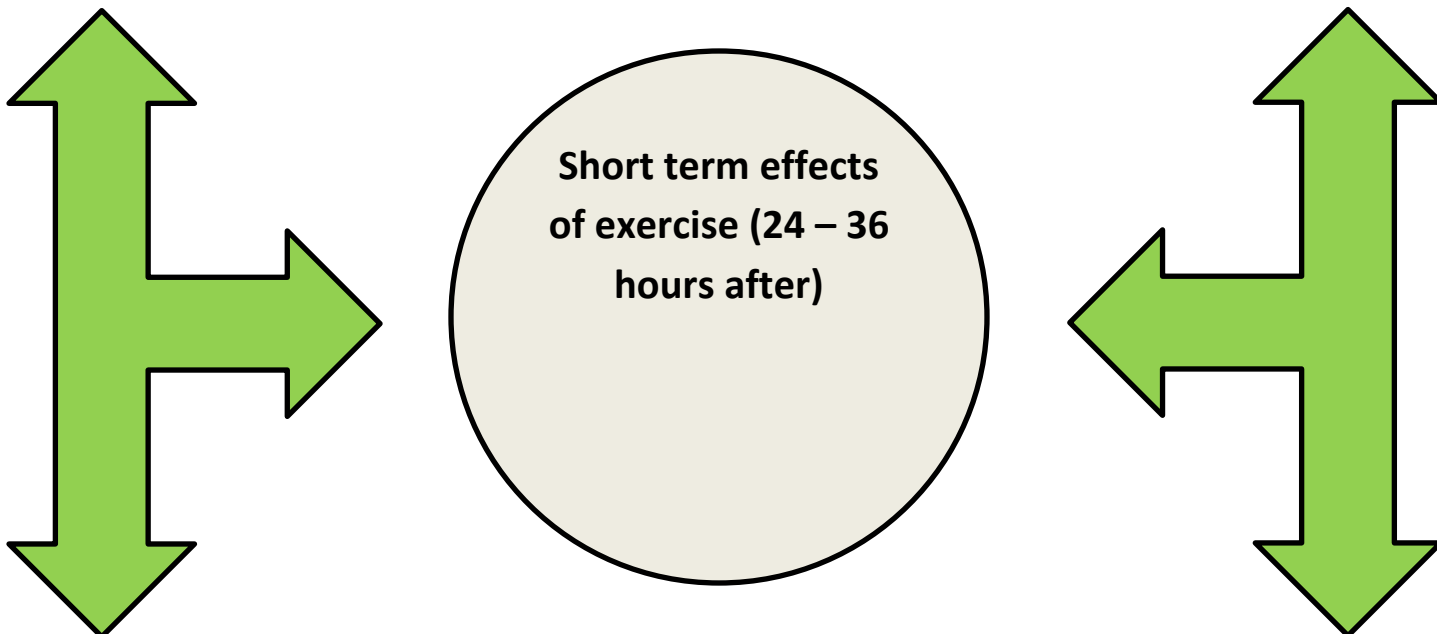
Immediate effects can be visible in **hot, sweaty and red skin**.

	Short term effects of exercise
Cardiovascular system	Increase in stroke volume (SV); increase in heart rate (HR); increase in cardiac output (Q); increase in blood pressure (BP)
Respiratory system	Increase in breathing rate; increase in tidal volume
Cardio-respiratory system removal	Increase in oxygen uptake; increase in carbon dioxide
Energy system	Increase in lactate production
Muscular system	Increase in temperature of muscles; Muscle fatigue

S-T Effects General

Tiredness and fatigue can be experienced in the days after heavy training or a big competition. This can be both **physical but also mental tiredness**. **Sleeping** well after training is therefore **very important** and can be thought of as part of an excellent recovery.

Light-headedness can be experienced in the hours after training and is usually a sign of either **dehydration or low energy stores** or both.



Short term effects
of exercise (24 – 36
hours after)

Nausea is a feeling of **sickness** that can take place during the hours and even days after **very intense physical exercise**. Athletes need to try to refuel even if they feel a little sick.

Delayed Onset of Muscle Soreness (DOMS) occurs when muscles experience pain for 24-48 hours after intense exercise due to **microscopic tears in the muscle fibers**. DOMS typically follows a **change in training or performance intensity** and the **muscles need to be rested** while in this condition to avoid injury.

Long Term Effects of Exercise

Taking part in regular exercise or training around **three times per week for six weeks** will lead to **adaptation of the body systems** that are used or trained. This has the effect of **increasing performance** in that type of exercise or sport and is often **beneficial to general health and everyday life**.



Resistance training increases strength

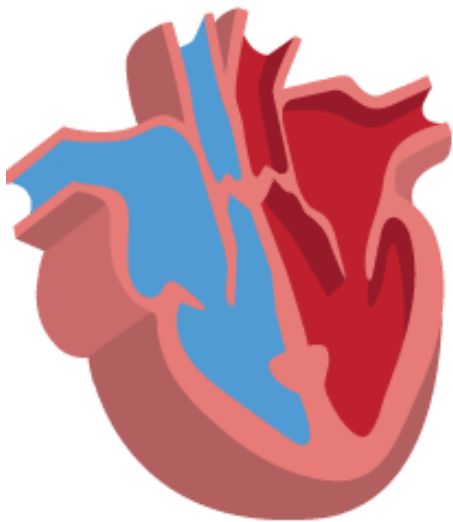
Aerobic training increases aerobic endurance

	Long Term Effects Of Exercise	Type of Training
Cardiovascular System	Cardiac hypertrophy; increased stroke volume (SV); decrease in resting heart rate (HR); increase in maximum cardiac output (Q); capillarisation at the lungs and muscles; increase in number of red blood cells.	Aerobic
Respiratory System	Increased number of functioning alveoli; increased strength of the respiratory muscles (intercostals and diaphragm). More efficiency in oxygen use.	Aerobic
Energy System	Increased production of energy from the aerobic energy system; increased tolerance to lactic acid.	Aerobic/Anaerobic
Skeletal System	Increase in bone density.	Resistance
Muscular System	Muscle hypertrophy; increased strength of tendons; increased strength of ligaments.	Resistance
Fitness	Increase in strength; increase in flexibility; increase in speed; increase in muscular endurance.	Resistance; Stretching; Interval

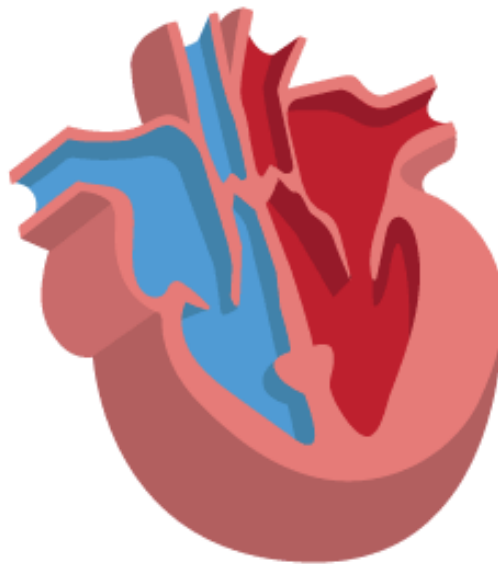
Cardiac Hypertrophy & Capillarisation

Hypertrophy means an **increase in size**, so muscle hypertrophy means the **muscles get bigger**. If you weight train regularly doing biceps curls, your biceps will show muscle hypertrophy. **Cardiac hypertrophy** is where the **ventricle wall gets larger** or thickens as a result of exercise.

Normal heart

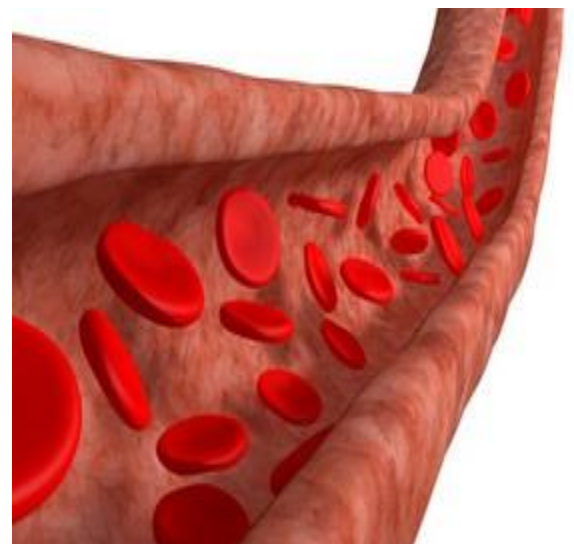


Left ventricular hypertrophy



The muscle wall of the **left ventricle increases** in size, meaning it is **able to pump out more blood during each contraction** which increases the stroke volume. **As stroke volume is increased, resting heart rate decreases** but cardiac output (Q) remains the same as $SV \times HR = Q$.

Capillarisation is the process where new **capillaries are formed**. Capillarisation takes place at the **alveoli in the lungs and at the skeletal muscle**. This has the effect of **increasing the amount of oxygen** that can be transferred to the working muscles as well as increasing the amount of **carbon dioxide that can be removed**.



Quick Questions

Which of the following is a short term response of the respiratory system to completing a training run?

- 1) Increase in stroke volume
- 2) Increase in lactate production
- 3) Increase in tidal volume

What typically happens to muscles temperature during a warm up?

- 1) Remains constant
- 2) Increase
- 3) Decreases

Which term describes the increase in size of the heart wall as a result of long term training?

- 1) Capillarisation
- 2) Cardiac Hypertrophy
- 3) Cardiac output

As a result of long term aerobic training, which type of blood cell would increase in number?

- 1) White
- 2) Platelets
- 3) Red

Which process describes the growth of blood vessels around the lung and muscle caused by long term training?

- 1) Hypertrophy
- 2) Capillarisation
- 3) Tolerance

Which muscle gets stronger as a result of training and increases the efficiency of the respiratory system?

- 1) Diaphragm
- 2) Biceps
- 3) Triceps

Which part of the heart thickens the most as a result of cardiac hypertrophy?

- 1) Atrial walls
- 2) Right ventricle
- 3) Left ventricle

Which of the following adaptations to training is an effect on the skeletal system?

- 1) Increased vital capacity
- 2) Increase in red blood cells
- 3) Increased bone density

Which of the following is an anaerobic effect of long term training?

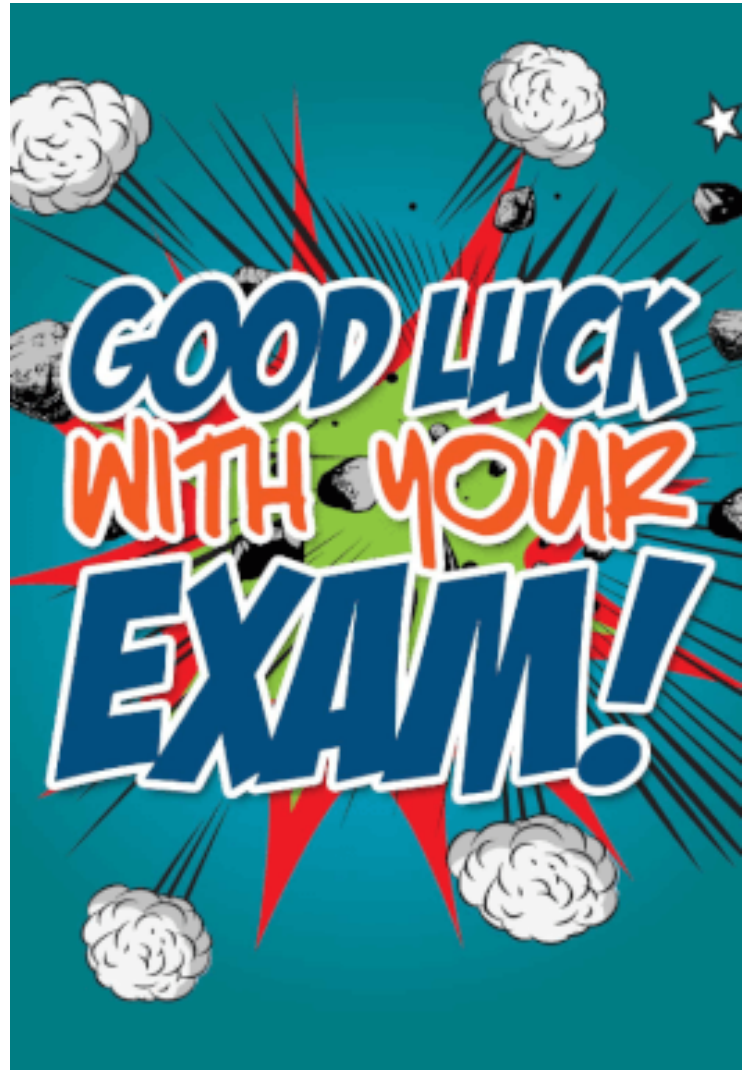
- 1) Increase tolerance to lactic acid
- 2) Increased number of functioning alveoli
- 3) Decrease in resting blood pressure

After exercise has been completed, what should be done to ensure that the muscles adapt?

- 1) Complete more training of the same kind
- 2) Rest
- 3) Complete a different training

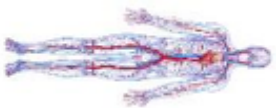
Answers

- 1) Increase in Tidal Volume
- 2) Increases
- 3) Cardiac Hypertrophy
- 4) Red
- 5) Capillarisation
- 6) Diaphragm
- 7) Left Ventricular
- 8) Increased bone density
- 9) Increased tolerance to lactic acid
- 10) Rest





Activity: Brace map – Short term adaptations of exercise



CV System



Respiratory System



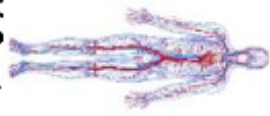
Muscular System



Skeletal System



Activity: Brace map – Long term adaptations of exercise



CV System



Respiratory System



Muscular System



Skeletal System

