

# Long Term Effects of Exercise on the Body Systems

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## Improved Cardiovascular Fitness

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If you do long term exercise, overtime you body adapts to it. In your lungs, more alveoli will be produced as well as capillaries so gaseous exchange will be more efficient. Your heart also becomes stronger and so an increased amount of blood can be pumped. This benefits you because you can take in more oxygen in one breath and more blood can get pumped to muscles. You can then endure exercise for longer and after some time it could become easier. Improved cardiovascular fitness will be beneficial to long distance runners and swimmers so then they can keep a steady pace for longer or even run that set distance quicker. This would not help a sprinter because they need speed as their race is over very quickly.

# Muscle Hypertrophy

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When you exercise, muscle hypertrophy occurs. If you train more then then the muscle cells begin to grow and become stronger. Exercise also means that oxygen can reach your muscles more efficiently so that they can work for longer. Muscles can then increase in size because of certain proteins and muscle fibres growing bigger. You will gain more strength due to muscle hypertrophy. Aerobic endurance is also improved. In badminton or tennis, you need to continuously be able to hit the shuttle so that it is powerful enough. These muscles needed are able to be strong enough because of muscle hypertrophy. A shot putter would need muscular hypertrophy so their muscles are strong enough to throw the shot as far as possible

# Increase In Bone Density

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Bone density is how strong your bones are. Physical activity causes tissue to form, this then makes the bones stronger. You are less likely to fracture bones or break them if you increase your bone density. Strong bones are needed for body support. Gymnasts need increased bone density because a lot of force is being put on to bones when performing various skills. Calcium is important in the building of strong bones as well as maintaining them that way. The more calcium we intake, the better it is for increased bone density. Rugby players are involved in a high impact sport that includes tackling, needing to be strong enough to withstand the tackle without breaking bones. Aerobics is a good sport to increase bone density as it is a weight bearing activity.

## Improved Muscular Endurance

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Exercise leads to improved respiratory system being more efficient and the intake of oxygen being increased. If there is more oxygen travelling in the blood stream then this means our muscles will be able to work for longer and harder without needing to rest. A long distance swimmer needs good muscular endurance in their arms as they are continuously using them to perform. Better muscular endurance means they can then travel longer distances. Long distance runners and cyclists need good muscular endurance in their leg muscles so that they can perform for long periods of time without tiring.

# Improved Posture

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The stronger your core muscles become, the more it will help you in everyday life. You will be more stable and during activities you gain more body support. By having stronger core muscles, you will prevent injury and reduce back pain. It can also improve your posture. A dancer needs core muscle to be strong in order to perform spins and leaps and keeping their balance whilst doing so. Gymnasts need a strong posture to be able to hold a balance or in handstand without falling. Sprinters need good posture so that they can keep themselves upright in a race.

# Increased Vital Capacity

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Exercise improves vital capacity as it means you have an increased amount of air being expelled from the lungs after breathing in. If your diaphragm is stronger then you are able to breathe in more oxygen. During exercise you are needing to get oxygen to your muscles quicker than usual. If you can breathe in an increased amount of oxygen in one breath because of improved vital capacity then you are able to reduce the build up of lactic acid. The amount of carbon dioxide being breathed out is also therefore increased. A marathon runner would need improved vital capacity so that they can perform better at a higher intensity for a longer period of time, likewise a long distance swimmer would benefit from increased vital capacity as they can take in more oxygen to provide their muscles with enough energy to last the entire race. A darts player would not need an increased vital capacity as they are not moving around as much.

# Improved Efficiency In Gaseous Exchange

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As exercise requires more blood, the body produces more capillaries. Gaseous exchange therefore becomes more efficient as there is an increased amount of networks for blood to diffuse through. The build up of lactic acid in muscles can be reduced as oxygen will be able to break down quicker and carbon dioxide expelled from the body faster too. Swimmers would benefit hugely from improved gaseous exchange as they need to endure the length or distance they are required to swim for. For marathon runners it is important they have efficient gaseous exchange as they can take in more oxygen which will provide them with more energy so they don't tire. A sprinter will be able to have a quicker recovery after their race as they are able to get more oxygen into the blood stream at a quicker rate.

# Cardiac Hypertrophy

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Your heart grows bigger and stronger because of exercise. By doing this it can cope with increased amounts of blood transporting oxygen to our muscles, meaning it is getting there efficiently. This has benefits of more blood getting pumped around the body and more nutrients being able to reach muscles faster. In a football or rugby match, if my heart was stronger it can pump more oxygen to my muscles quicker so that I can endure the game without having many chances to take a breath. A long distance runner will be able to run for longer without getting tired as more blood can get pumped around the body.

# Increased Thickness of Hyaline Cartilage

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Regular exercise helps for the hyaline cartilage to become thicker and strengthen. Thicker hyaline cartilage reduces the risk of injury and types of arthritis. In running, your knee joint is protected by this cartilage as it absorbs the pressure when your foot hits the ground. It is important for gymnasts also because when they make a hard landing they need the hyaline cartilage to prevent injury. People who play netball and basketball constantly are putting pressure on their knee joints when they land from catching a ball, so more hyaline cartilage is needed.

# Drop in Resting Heart Rate

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Long term exercise means that your heart will gradually not have to beat as fast and be able to pump more blood out to the body in one beat. Having a lower resting heart rate means that you can work at higher intensities for longer. This is because your heart isn't having to work as hard to get the required blood around the body. A cross country runner would see improvements in their performance the more they trained as they would most likely be able to run a set distance quicker. Rugby players have to endure the full 80 minutes of a match and can perform at higher intensities throughout the game without getting tired. A badminton player will be able to work harder if they have a lower resting heart rate as more blood can be pumped around the body more quickly producing higher amounts of energy.

# Decreased risk of Hypertension

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Your heart will pump blood harder and faster to get blood and oxygen to your muscles. If your resting blood pressure is low, your heart is more efficient and it prevents the risk of stroke or blood clots in arteries. A wide range of sports would need to have a low resting blood pressure so that potential blood clots can be avoided. Athletes that perform at high intensities such as weight lifters and sprinters are at risk of suffering from blood clots if they have high blood pressure. Someone who has hypertension should begin with low intensity work like walking.

# Increase Number of Mitochondria

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The more exercise you do, the more mitochondria you will have. It is important to have lots of mitochondria as these are what increases our energy production. So if more energy can be produced because of the increased amount of mitochondria then it means your body will be able to last longer or work harder in a chosen exercise. A cyclist will be able to perform for longer at higher standards as they have more energy. A hockey player will perform at higher standards due to an increased amount of mitochondria. A 200m sprinter can run faster as they are able to produce more energy.

# Decreased Risk of Osteoporosis

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Osteoporosis is when bones become brittle and can fracture easily, mainly affecting older people. The more calcium you intake, the more you can prevent the onset of osteoporosis. If you exercise more then your bones are stronger, like doing jogging and weight bearing exercises. Osteoporosis occurs because calcium in bones is lost quicker than it can be replaced. Weight bearing classes like Zumba and aerobics will also increase bone density.

# Increase in Stroke Volume

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Stroke volume is the amount of blood that leaves the heart in a beat. The more you exercise the stronger your heart will become and so can then pump more blood, increasing stroke volume. When stroke volume increases so does cardiac output which is the amount of blood leaving the heart in a minute. This would benefit a footballer because they are going to get more blood more quickly to their working muscles so that they can work at higher intensities. A triathlete would be able to get an increased amount of blood around their body so they would be able to work for longer periods of time. This would be relevant to a javelin thrower after their event as they are able to recover more quickly.

# Stronger Connective Tissues

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As you exercise more, your tendons and ligaments become stronger. Tendons that attach muscle to bone need to be strong enough to provide movement. Ligaments are what attach bone to bone, it is important they are strong so they can hold bones together and keep the joints stable. This reduces the risk of developing arthritis. In gymnastics, if you are to land a skill, you could land hard and therefore having strong ligaments and tendons reduces the chances of injury or dislocation. Other sports like netball and basketball are also high impact because they involve lots of jumping and landing. Therefore it is important to have strong connective tissues in the knees because this is what reduces impact.

# Increased Maximum Oxygen Uptake-VO<sub>2</sub> Max

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Your VO<sub>2</sub> max is the maximum amount of oxygen your body can consume during exercise. Exercise improves your cardiovascular system so that you are able to inhale larger amounts of oxygen in one breath. By having more alveoli and more capillaries your body can get more oxygen around. Also by having stronger intercostal muscles, means you can lift the ribcage up and out so more air can be inhaled. A swimmer has to breathe in as much as possible in a race as they would do 2-4 strokes underwater and therefore need to make the most of the breath they take and produce enough energy. Long distance runners can work at high intensities which means they will be able to run faster. A sprinter won't be able to take in as much oxygen during the race as there is little time but once they have finished they will recover quicker as they can breathe in more oxygen quicker.