

A level Physical Education

Edexcel A Level Physical Education
Feedback on Summer 2019:
Components 1 and 2





Question 9 Example

rate of firing rate of fibre recruitment

9 Examine the function of the neuromuscular system in a muscle contraction. (8)

A muscle contraction begins as ~~the~~^{an} electrical impulse travels down the axon. The axon is covered in a ~~myelin~~^{myelin sheath} with nodes of Ranvier. The electrical impulse will jump over the nodes of ~~ranvier~~^{Ranvier} to increase the rate at which the impulse passes along the axon, this is an advantage of having the nodes of Ranvier. When the electrical impulse reaches the ~~neuromuscular~~^{neuromuscular} junction, ~~acetylcholine~~^{acetylcholine} is released across the synaptic cleft as a neurotransmitter. It binds to the receptor proteins on the post-synaptic membrane, depolarising the sarcolemma and generating an action potential. This causes calcium ions (Ca^{2+}) to be released into the muscle fibres. Ca^{2+} travels to the myofibrils, where it binds to the troponin on the actin, causing the troponin to move, exposing the binding site. Now, the myosin heads can bind to the actin, forming an actin-myosin crossbridge. The myosin then pulls the actin along its length to generate a muscle contraction. ATP is used as the energy for this, so the ~~more~~^{rate of} contraction can happen to provide ATP, the ~~rate~~^{rate of} contraction is initiated. Also, the increased rate of firing ~~to~~^{increases} the muscle fibres will ~~increase~~^{increase} the contraction speed. The all or none law suggests that all the recruited fibres will contract at the same force, so the ~~neuromuscular~~^{neuromuscular} system can increase (Total for Question 9 = 8 marks)

The amount of muscle fibres recruited to produce a bigger contraction.



Question 10 Example 2

10 Examine how athletes might adapt their subsequent training in order to cope with the effects of exercise induced muscle damage (EIMD) and delayed onset of muscle soreness (DOMS).

(8)

They would use principles of training, such as F.I.T.T.
Frequency, if they were they would train so it
they're experiencing EIMD or DOMS would train
less frequently to allow an increased recovery
between training sessions. Intensity of training
may be reduced to a manageable intensity, still
challenging the athlete, but intense enough to
take into consideration their muscles. They may train
for a less amount of time, shortening training
sessions, in order to not over exert their muscles
which could result in over training. They could also
change the type of training to allow for more
rest periods in between efforts, allowing them
to recover - reducing DOMS and EIMD.

(Total for Question 10 = 8 marks)



Question 24: Example 1

24 Discuss how an athlete might seek to prevent injuries. (15)

*Controlling
Managing risk
- Reducing
- Muscle balance*

Preventing injury is the aim of not allowing an injury to occur, before a performance. One way an athlete may try to prevent injury is by managing risk, this involves identifying any potential risks, finding solutions or removing the risks and identifying when or not to participate. Managing risk may include completing a risk assessment and identifying all risks to the athlete. For example, a cyclist may look at the terrain, to look for any dangerous hills or hidden dips, they may not have seen it. They should complete a risk assessment. This allows them to prepare for the risk and avoid it if possible. Another risk a cyclist may identify is if it is windy, they will know when not to go slower in open areas as the wind may cause them to fall off, once on the side, lessening the chance of injury. However, completing a risk assessment takes time and can require technology, such as wind trackers that may not be accessible to all athletes.

Another way an athlete may try to reduce the chances of injury is protective equipment. This is the use of using equipment such as helmets to ensure that the least amount of damage can be caused caused to the individual. A cricket player uses protective



Question 24: Example 1

equipment such as helmets, pads and gloves. This is to ensure that the risk of injury is as small as possible when batting and facing a cricket ball.

A problem with protective equipment is that it is expensive and poor, cheap equipment could not provide sufficient protection, leading to injury.

Another method is conditioning. This can involve training for weeks/months before a performance, to ensure that the body is ready and able to perform and can handle simply utilising a correct and sufficient warm up before exercise. Conditioning before a performance ensures that the muscles can withstand the intensity of the performance and ensure that the level of fatigue is suitable for the duration of performance. Conditioning for a marathon runner may include continuous training and other targeted aerobic training. Completing a suitable warm up is essential before performance as it gets the muscles warmer and increases the elasticity of the muscles, meaning they will be less likely to ~~tear~~ tear.

Another way of reducing the risk of injury is to ensure that muscle balance in the body is equal. If a working muscle pair such as the biceps brachii and triceps brachii are not balanced



Question 24: Example 1

It can cause the stronger muscle to strain the antagonist muscle, in this case being the trapez brachii, causing it to tear or become over stretched. A deadlifter would need to ensure that their muscles are balanced, as they will be lifting very heavy weights. If the latissimus dorsi is much stronger than the quadriceps, the lifter will lift too much weight for the quadriceps to cope with, causing serious injury to the quadriceps. Muscle balance can be hard for some individuals as natural genetics and their upbringing can cause some muscle groups to be stronger than others. This can be a very long process to correct and is very time consuming. Some athletes may seek out specialist advisors or trainers to aid in this process, also creating a financial problem too.

~~To conclude, there are many ways to~~ To conclude, there are many ways to reduce the risk of injury, however they require specialist knowledge and an understanding of the risks. These practices can also be unsuccessful, for example James Anderson was tested using force plates with his bowling. Scientists discovered that he was applying too much force ~~there~~ when running up and suggested he changed his bowling style. This change caused him to fracture his back while bowling. Therefore I think these performance related things can be successful with the right technique, however individual characteristics must be considered. (Total for Question 24 = 15 marks)

TOTAL FOR SECTION B = 70 MARKS
TOTAL FOR PAPER = 140 MARKS