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Answers

Exam-style questions

Adam Morton

Check your answers to the questions in this issue.

Types of muscle contraction and triphasic training (pp. 18–21)

1

Joint	Type of joint	Joint movement from A to B	Agonist	Type of contraction
Ankle	Hinge	Dorsi-flexion	Gastrocnemius	Eccentric
Knee	Hinge	Flexion	Rectus femoris	Eccentric
Hip	Ball and socket	Flexion	Gluteus maximus	Eccentric

- 2 **Isometric contraction** involves a muscle-generating force but with no change in length and therefore no change of joint angle. For example, isometric contraction of the quadriceps (e.g. the rectus femoris) maintains flexion at the knee when a prop is pushing in a scrum.

Concentric contraction is a type of isotonic contraction in which the muscle shortens under tension and causes movement at a joint. For example, concentric contraction of the gastrocnemius leads to plantar flexion at the ankle in the take-off phase of the long jump.

Eccentric contraction is a type of isotonic contraction in which the muscle lengthens under tension and controls movement at a joint. For example, eccentric contraction of the gluteus maximus controls hip flexion as a gymnast lands in a squat position from a vault.

- 3 The action potential travels down the motor neurone and reaches the synapse (neuromuscular junction). A neurotransmitter (acetylcholine) is released into the synaptic cleft and binds to receptors in the post-synaptic membrane. If it is sufficient, the neurotransmitter binds with the post-synaptic membrane to meet the threshold for contraction and all the fibres within that motor unit contract. If not, then none of the muscle fibres in that motor unit contract. This is known as the 'all or none' law.

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