Familiarise yourself with the two diagrams to do with muscles and movement analysis.

Task 1 – Exercise Physiology

Select a sport of your choice and up to 4 sporting actions within that particular sport. For example, in trampolining you might like to choose a pike jump, a straddle jump, a half-twist and a back somersault, whilst in basketball you could choose a lay-up, a jump shot, a cross-over and a set shot.
Once you have chosen your sport, produce 4 labelled diagrams that detail the joint, joint type, articulating bones, movement occurring, muscles involved in that action and the type of contraction produced.
You should also detail the type of levers involved and the planes and axes that the movement occurs in.

You may need to do a little bit of research for the following tasks:

Task Two: Skill Acquisition

Give a description and a sporting example of each of the following skill continua. Use your examples above to help you.

-Open / closed skills
-Gross / fine skills
-Self- paced / externally paced skills
-Discrete / continuous - fine skills
-High / low skills
-Simple / complex skills

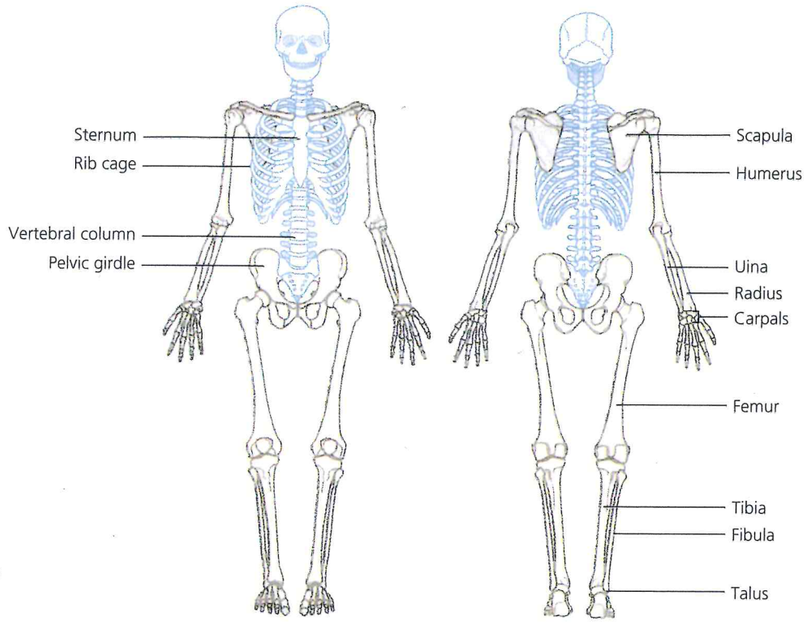
Task 3: Sport and Society

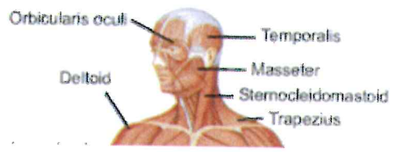
Continuing to focus on the sport chosen above, please describe (using up to 750 words) the impact technology has played on that sport across the last 15 years. You can focus on the development of equipment, performance analysis, injury rehabilitation, recovery from training and competitions, as well as the impact it has had on officiating and spectators.

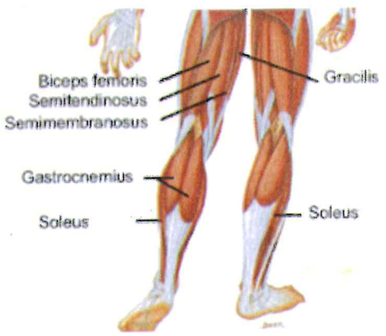
Joints, muscles, bones and movement

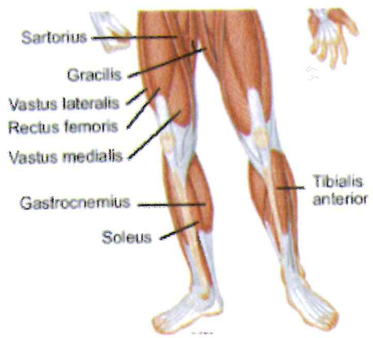
Task 1: Learn the names of muscles, bones and joints

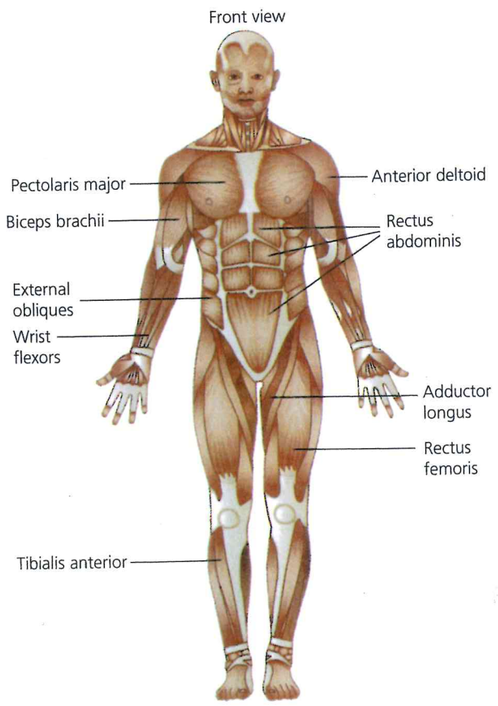
Task 2: Understand how the joints move

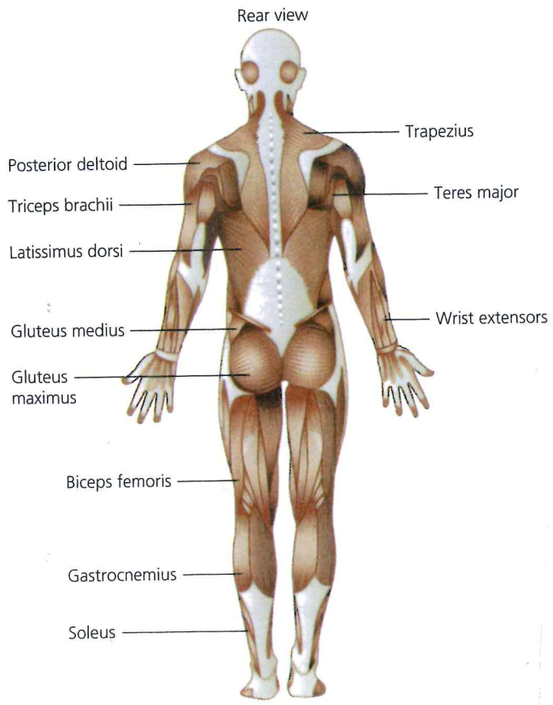


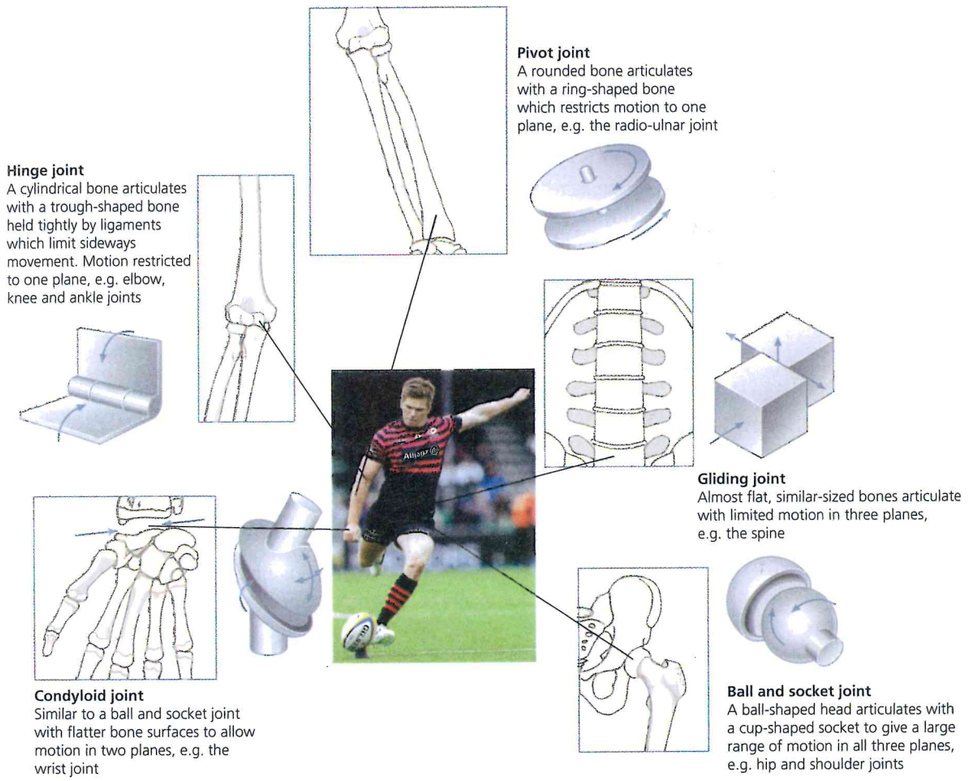












▲ Figure 1.1.3 Types of synovial joint

Common features of a synovial joint	Structure	Function
Ligament	A tough band of slightly elastic connective tissue	Connects bone to bone and stabilises joints during movement
Synovial fluid	Lubricating liquid contained within the joint cavity	Reduces friction and nourishes articular cartilage
Articular cartilage	Smooth tissue which covers the surface of articulating bones	Absorbs shock and allows friction-free movement
Joint capsule	A fibrous sac with an inner synovial membrane	Encloses and strengthens the joint secreting synovial fluid
Bursa	A closed, fluid-filled sac found where tendons rub over bones	Reduces friction between tendons and bones

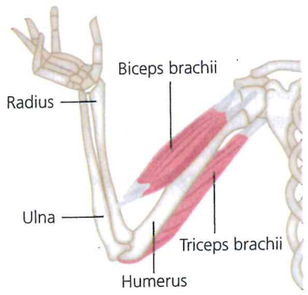
Muscle contraction

A muscle uses energy to create force. It is this force that can create human movement and even be passed onto an object such as a ball. Muscles create this force by contracting. Just as a muscle has three potential roles to perform, it can also contract in three different ways.

Isotonic muscle contraction is when a muscle changes length during its contraction. This can occur in two ways:

- **Concentric** muscle contraction is when a muscle shortens producing tension. This produces the force to pull two bones closer together, causing joint movement: for example, in the upwards phase of a biceps curl, the biceps brachii concentrically contracts to lift the weight to the shoulder.
- **Eccentric** muscle contraction is when a muscle lengthens producing tension. This resists forces, such as gravity, to control joint movement: for example, in the downward phase of a biceps curl, the biceps brachii eccentrically contracts to lower the weight under control.

Isometric muscle contraction is when a muscle contracts but does not change length: for example, the biceps brachii holding a free weight in the hand still. The muscle will create tension as it pulls on the tendon attachments; however, no movement is created. Posture is maintained by muscles isometrically contracting.



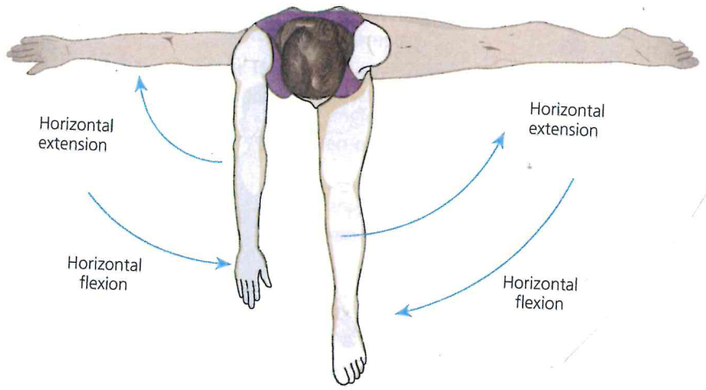
◀ Figure 1.1.12 The elbow joint where the biceps and triceps brachii work together to lift and lower the forearm in a biceps curl

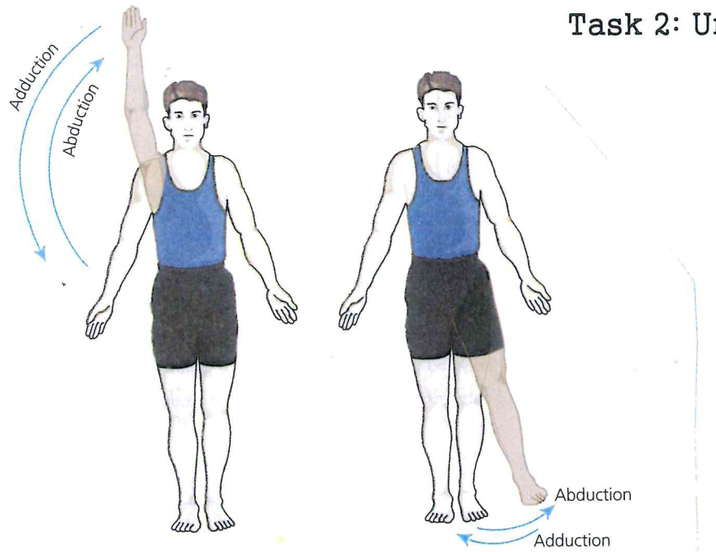
Antagonistic muscle action

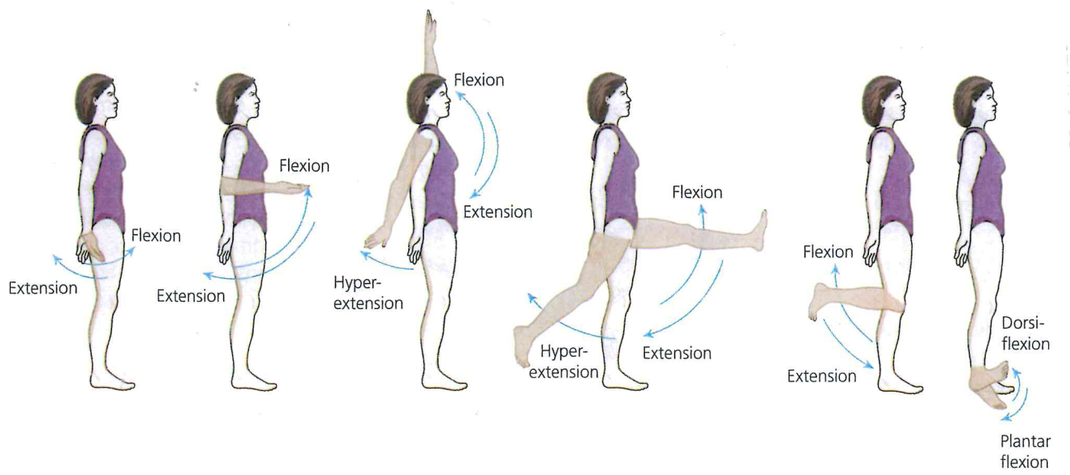
Muscles never work alone. They work in pairs or groups to produce co-ordinated movement. Each muscle takes on a different role which, depending on the type of movement produced, can change. There are three main roles a muscle can adopt:

1. **Agonist:** a muscle responsible for creating movement at a joint. Also known as the prime mover.
2. **Antagonist:** a muscle that opposes the agonist providing a resistance for co-ordinated movement.
3. **Fixator:** a muscle that stabilises one part of a body while another causes movement.

Movement	Agonist	Antagonist
Flexion (wrist)	Wrist flexors	Wrist extensors
Flexion (elbow)	Biceps brachii	Triceps brachii
Flexion (shoulder)	Anterior deltoid	Posterior deltoid
Flexion (hip)	Ilipsoas	Gluteus maximus
Flexion (knee)	Biceps femoris (hamstring group)	Rectus femoris (quadriceps group)
Dorsi-flexion (ankle)	Tibialis anterior	Gastrocnemius and soleus







Muscle contraction and movement

Task 1: Learn the different types of contraction

Task 2: Understand how to describe movement at a joint