

## The functions of skeletal muscle

Skeletal muscle has a number of different functions:

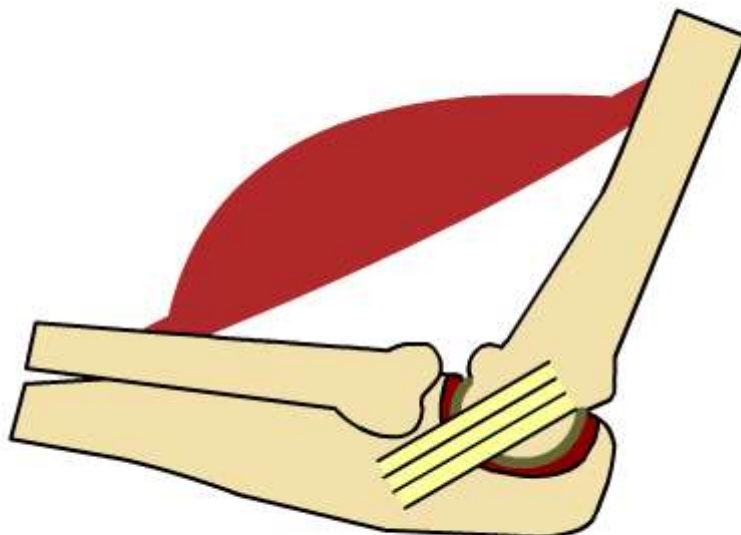
- motion
- posture
- storage of glycogen
- venous return
- thermogenesis

### Movement

Skeletal muscles create movement by working in conjunction with the skeletal system and joints of the body.

Together with the nervous system, muscles control the voluntary or conscious movement of the bones and also maintain posture. Muscles are attached to the bones by tendons, which are formed from the connective tissue which surrounds the muscle fibres. Their attachment into the periosteum (connective tissue) of the bone allows the bone

to act as a lever when the corresponding muscles are contracted. Muscles also provide the energy for the movement to take place.



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## Text

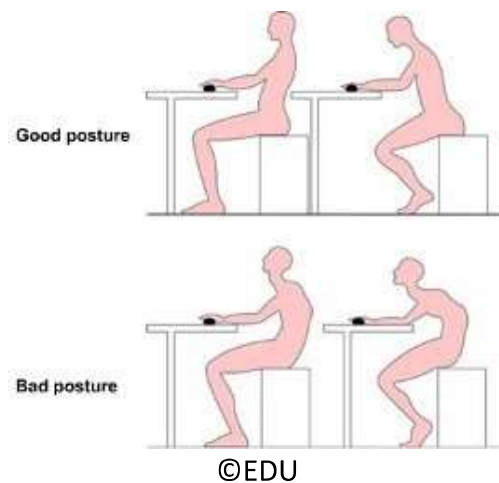
Muscle is attached to bone by tendons, ligament attaches two bones at the joint, joint is protected by cartilage in a joint capsule.

## Posture

Good posture is a result of well-balanced muscles. Muscles retain control over our body position by some fibres constantly contracting slightly to keep our bones in place, so balanced power between two opposing muscle groups is essential for good posture.

If a muscle is maintained at the right resting length with good muscle tone, then the bones attached to that muscle will be held in the correct biomechanical position and good posture is observed.

However, there are many examples of poor posture in everyday life, often caused by our lifestyle.

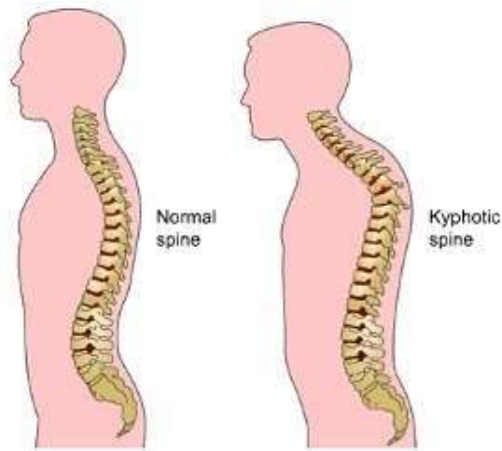


## Kyphosis

Although elasticity is also a characteristic of skeletal tissue, if any muscle is held at a certain length (longer or shorter) for long periods of time, it may gradually alter its resting length.

Kyphosis is exaggerated curvature of the cervical vertebrae and can be due to the shoulder girdles being protracted forwards (hunched shoulders) for too long.

Over time this can stretch and lengthen the resting length of the muscles in the upper back. As these muscles are attached to the clavicle and the scapula, they can alter the position of the bones they are attached to.

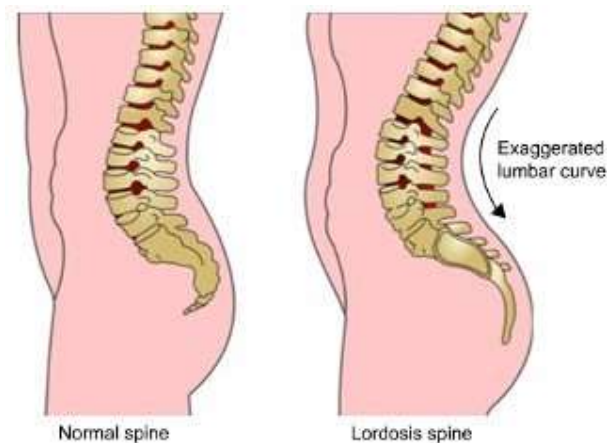


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## Lordosis

Another common postural condition is lordosis, which is exaggerated curvature of the lumbar vertebrae. The lumbar vertebrae have a natural curve which helps this part of the spine to cope with the weight of the body, but if more weight is applied to the front of the body, for instance during pregnancy, or if the abdominal muscles are not utilised to help with everyday stabilisation, the lumbar curve can become exaggerated.

If this happens, the muscles surrounding the lumbar vertebrae (erector spinae, transversospinalis and segmental back muscles) become tighter and the opposing abdominal muscles may become longer and weaker.

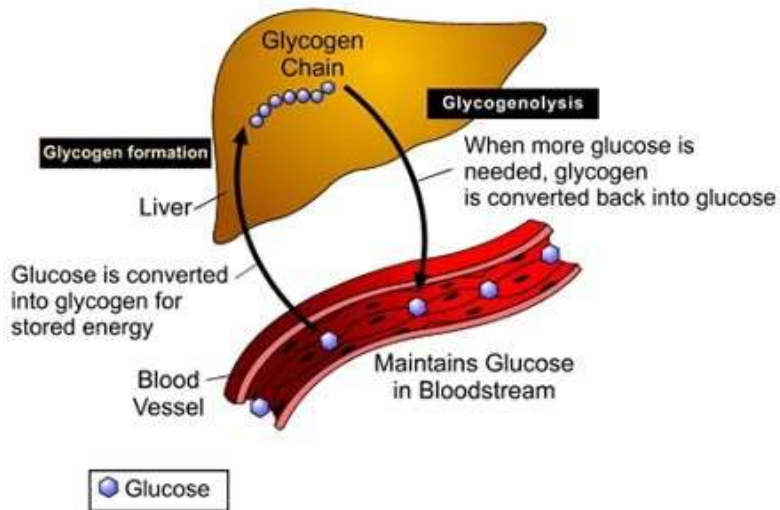


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## Glycogen storage

Muscles are a major site of glycogen storage in the human body. Glycogen is the storage form of glucose, which we use for energy. Glycogen is stored in the muscles and liver and converted into glucose whenever blood glucose levels begin to drop.

The average person stores 1500 – 2000 calories as glycogen and each gram of glycogen is stored with a few grams of water.



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### Text version

Diagram showing glucose molecules in the blood stream and a glycogen chain in the liver.

**Glycogen formation:** Glucose is converted into glycogen for stored energy.

**Glycogenolysis:** When more glucose is needed, glycogen is converted back into glucose.

This process maintains glucose levels in the bloodstream.

## Thermogenesis

Thermogenesis means the creation of heat. Muscular contractions are thought to create as much as 85% of all body heat. Heat is a by-product of muscular contraction and this is utilised to maintain normal body temperature.

If body temperature drops, the central nervous system initiates an involuntary contraction of skeletal muscles known as shivering in order to generate heat and elevate the body temperature.

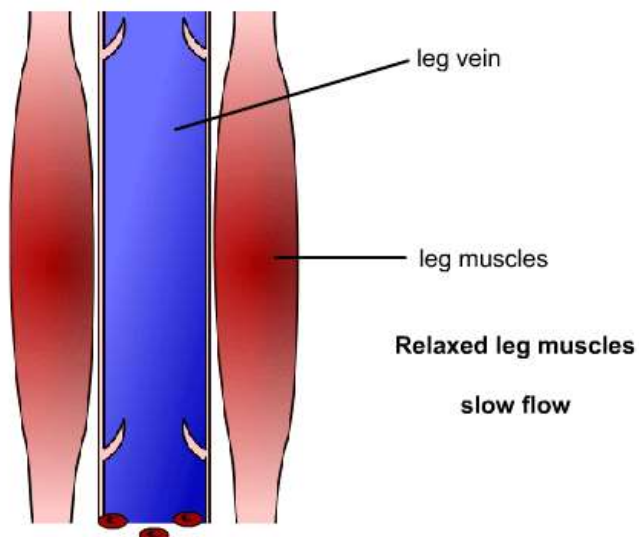


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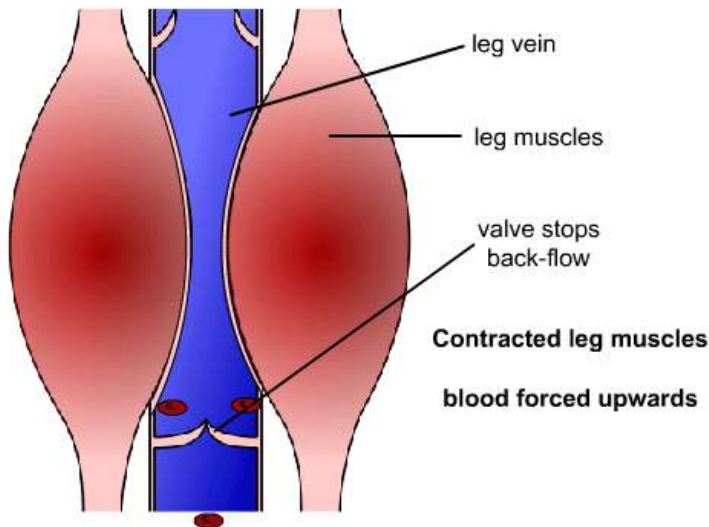
## Venous return

Although the walls of blood vessels do contain smooth muscle to help them contract and relax, the skeletal muscles also play a part in helping blood to return to the heart through the veins. This is particularly important in the lower limbs, where gravity makes venous return (blood flow back to the heart) more difficult.

When the skeletal muscles surrounding a vein contract, this gently squeezes the vein, and the flow of blood towards the heart is assisted by the pressure of the contracting muscle. This pressure also closes the lower valve in the vein, preventing deoxygenated blood being forced backwards.



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## Quiz

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## Muscles of the human body

There are almost 700 skeletal muscles in the human body. Take a look at these diagrams and familiarise yourself with the major muscles shown.

### Anterior muscles

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### Posterior muscles