



Knowledge Organiser- Unit 1- Body Systems- Muscular System

Know It

Types of Muscle Contraction

Isotonic Contractions

These contractions occur when there is movement of the body. The ends of the muscles move closer together to cause the movement. Occurs when the muscle shortens e.g. biceps contracting concentrically during the upwards phase of a bicep curl / triceps contracting concentrically during the upwards phase of a press-up

Isometric Contractions

This type of contraction takes place when the body is being held in the same position. The length of the muscle during these contractions stays the same length. Occurs when the muscle lengthening (antagonist) is under tension. An eccentric contraction provides the control of a movement on the downward phase and it works to resist the force of gravity e.g biceps contracting eccentrically when lowering the weight in a bicep curl / triceps contracting eccentrically during the downwards phase of a press-up.

The effects of exercise on the muscular system-

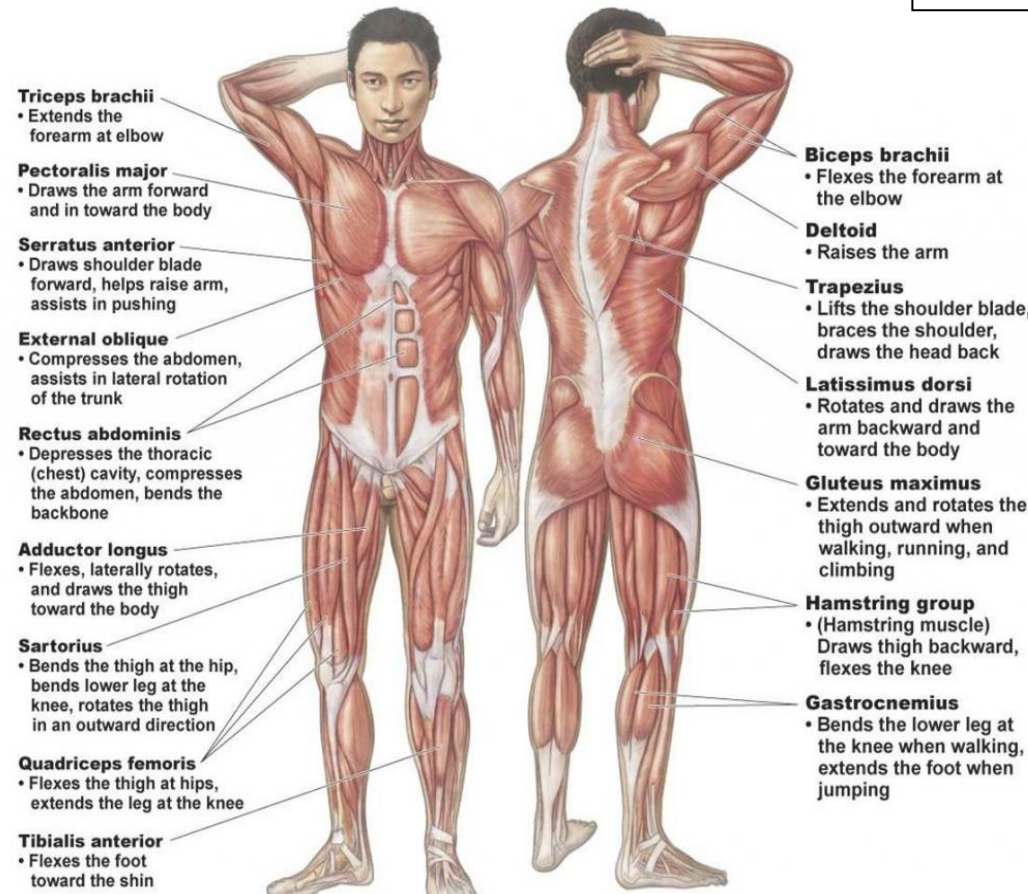
Short- Muscle damage- this includes pulling or straining your muscles. It happens when sudden movements are made or over stretched, it can be avoided by properly warming up, cooling down and stretching properly. This also can happen short term, like players/athletes pulling and straining muscles.

Long- Hypertrophy is the thickening of tissue. This makes it harder for injury to occur. This gives the bone more protection so bones don't chip and break so easy. Tissue injuries include sprains:

Increased strength of tendons. This improves the risk of injury as it is more unlikely to pull and tear muscles as they are now stronger.

Key Words-

Agonist	Flexion
Antagonist	Extension
Movement Analysis	Pronation
Dorsi Flexion	Supination
Plantar Flexion	



Hypertrophy- an increase in muscle size.

Hyperplasia- the muscle fibres splitting to increase numbers.

Contraction time- the speed at which fibres contract.

Motor Neuron- the number of fibres attached to a nerve.

Resistance to fatigue- how quickly muscle fibres get tired.
Force production- how hard fibres contract, often related to the size of the neuron.

Mitochondria- The powerhouse of the body. Provide oxygen to muscles.

Capillary density- provide the opportunity for oxygen to diffuse to muscles. The increase in density provides more oxygen.

Oxidative capacity- the muscles capacity to use oxygen.

Glycolytic capacity- the body's capacity to use glycogen.

Major fuel- the fuel source used by muscles. Triglycerides, glycogen and creatine phosphate.

Muscle Fibres-

Slow twitch (Type 1- SO) fibres are designed for aerobic exercise, using oxygen to produce a small amount of tension over a long period of time

- They are very resistant to fatigue as the speed of the contraction is slow

- They have a higher capacity for aerobic respiration

- They are red in colour because of more myoglobin

- Performers in endurance events tend to have a higher percentage of slow twitch muscle fibres

Fast twitch (2a FOG)

These anaerobic fibres are more resistant to fatigue than type 2b FOG fibres though Activities such as a 200m swim or 800m race will rely on type 2a fibres.

Fast twitch (2b FG)

Type 2b fibres have the greatest anaerobic capacity

-Generate largest amount of force of contraction

-Very poor resistance to fatigue

-Expect a Sprinter or Shot Putter to have large amounts of FTG fibres