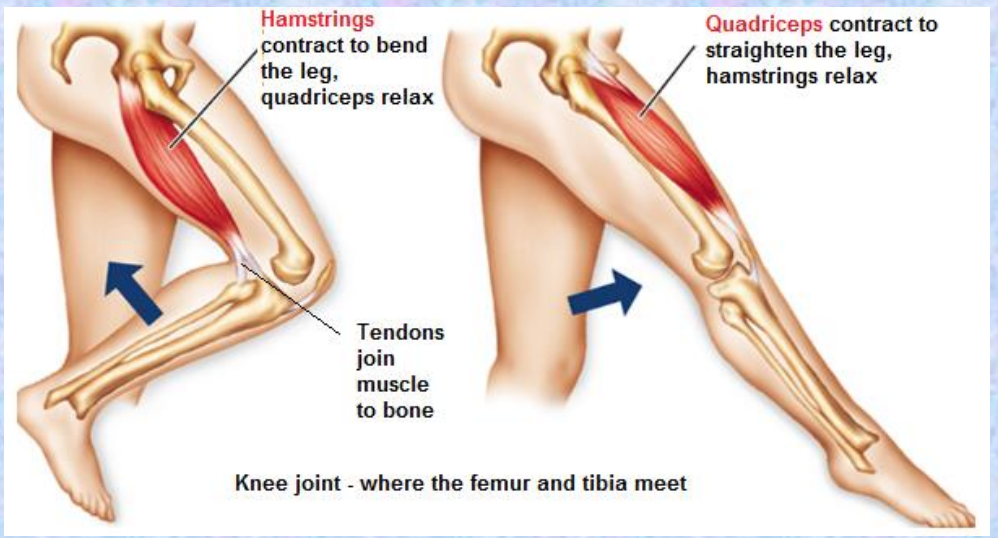
Antagonistic muscle pair – quadriceps and hamstrings

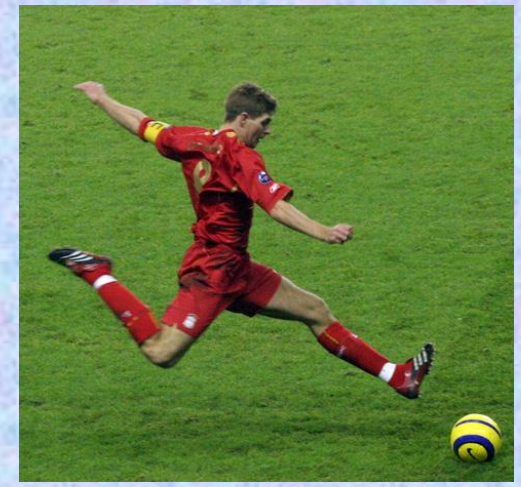


Antagonistic muscle pairs

- When one muscle **contracts** the other **relaxes**
- As the muscle contracts, it **pulls** on the bone, using the **tendons**, creating movement at the joint

KNEE joint =
Femur
Tibia

Joint – a place where two or more bones meet



The KNEE joint (hinge) allows flexion and extension

Flexion – bending the leg at the knee. Hamstrings contract

Extension – straightening the leg at the knee. Quadriceps contract

The cardiovascular system
Heart / blood / blood vessels

ARTERIES: carry **OXYGENATED** blood around the body
VEINS: carry **DEOXYGENATED** blood back to the heart

During exercise the following increase:

- ✓ **Stroke volume**: more blood is pumped by the heart **per beat**
- ✓ **Heart rate**: number of **beats per minute** increases to pump more blood (oxygenated around the body/deoxygenated to the lungs)
- ✓ **Cardiac output**: as a result of increases in stroke volume and heart rate, the **amount of blood pumped per minute** increases

The respiratory system

Gaseous exchange: delivery of **oxygen** from the lungs to the bloodstream, and the removal of carbon dioxide from the bloodstream to the lungs

Breathing rate **increases** when we exercise to breathe in more oxygen and breathe out carbon dioxide at a faster rate

Mechanics of breathing:

Breathing in - air (containing mostly oxygen) through the nose and trachea, ribs move up and out and diaphragm flattens, air fills up the lungs

Breathing out - diaphragm relaxes, ribs move in and down, air (containing mostly carbon dioxide) is forced from the lungs, up the trachea and out of the nose

Anaerobic and aerobic exercise

Aerobic (with oxygen) - running down the pitch to score a try
Anaerobic (without oxygen) - a quick tackle

Short term effects of exercise:

Tiredness/fatigue Light headedness Nausea

Delayed onset of muscle soreness (DOMS)/cramp.

Long term effects of exercise:

Improvements in cardiovascular endurance / muscular endurance / speed / agility / muscle strength Improved body shape