



# YMCA Awards

Level 3 Applied anatomy and  
physiology  
2018

# Level 3 Applied anatomy and physiology

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## **The effects of exercise on the musculoskeletal system**

## **Learning outcomes**

By the end of this session you will be able to:

- Explain the short and long-term effects of exercise on the musculoskeletal system
- Explain the term ‘Delayed Onset of Muscular Soreness’ (DOMS)
- Compare the effects of different types of exercise on the prevention and treatment of osteoporosis and osteoarthritis

## **Short-term effects of exercise on the musculoskeletal system**

- Muscle temperature and overall core body temperature increase
- Levels of lactic acid in the blood rise, causing a burning or aching sensation in the muscles
- Joints become more mobile due to increased flow and viscosity of the synovial fluid

## **Long-term effects of exercise on the musculoskeletal system**

- Increase in muscle strength
- Joints become more stable
- Increase in the number and size of mitochondria in muscles
- Muscles capable of utilising more oxygen and fat at any given time

## **Delayed onset of muscular soreness (DOMs)**

- Muscle pain, soreness or stiffness that is felt 12–72 hours after exercise
- Involves protein degradation and ultrastructural changes

## **Delayed onset of muscular soreness (DOMs)**

Likely causes include:

- Beginning a new exercise programme
- A change in sports activities
- An increase in the duration or intensity of exercise or activity
- Activities which include an eccentric training component



## **Osteopenia and Osteoporosis**

The measure of bone mass is called a T score which is the difference between actual bone mass and expected bone mass and is measured as a standard deviation (SD) from the norm

Osteopenia – a condition where bone mass is below what is expected, but not yet classified as osteoporosis between -1 and -2.5 SD

Osteoporosis - significantly reduced bone mass where bones are becoming fragile and brittle  $>-2.5$  SD

# The benefits of weight-bearing exercise for osteopenia and osteoporosis

- Development of increased bone mass
- Reduction in loss of bone mass
- Increased joint stability and strength
- Better nourished joints
- Can help support symptoms of osteoarthritis
- Can lesson likelihood of developing osteoporosis

## **Osteoarthritis**

The main symptoms are joint pain and stiffness

There may be swelling, tenderness and a grating or crackling sound when moving the affected joints

The severity of osteoarthritis symptoms can vary greatly from person to person, and between different affected joints

Almost any joint can be affected by osteoarthritis, but is most common in the knees, hips and small joints of the hands

## **Osteoarthritis**

Arthritis UK recommends avoiding exercise that puts any strain on joints and forces them to bear an excessive load, such as running and weight training

Exercises such as swimming and cycling, where joints are better supported and more controlled, are recommended

