

# **SUPPORT AND MOVEMENT**

***MUSCLES AND MOVEMENT***

***DISORDERS OF THE SKELETAL SYSTEM***

## LEARNING OBJECTIVES

*Students will be able to:*

1. define antagonism;
2. describe the action of flexors and extensors as a pair of opposing muscles;
3. describe the effects of deficiency of calcium on bones and relate this deficiency of osteoporosis;
4. discuss the causes, symptoms and treatment of arthritis;
5. relate the onset of arthritis with age and weight-bearing joints.

## Antagonism

Most muscles work in pairs, and when a muscle works it needs to have an agonist and an antagonist, unless the muscle's natural state is opposite to that which is produced by the muscle, example Sphincter ani externus muscle. An "antagonist" is a classification used to describe a muscle that acts in opposition to the specific movement generated by the agonist and is responsible for returning a limb to its initial position.

Antagonistic muscles are found in pairs called antagonistic pairs. These consist of an extensor muscle, which "opens" the joint (i.e. increasing the angle between the two bones), flexor muscle, which does the opposite to an extensor muscle.

Antagonistic pairs are needed in the body because muscles can only exert a pulling force, and can't push themselves back into their original positions. An example of this kind of muscle pairing is the biceps and triceps.

When the biceps are contracting, the triceps are relaxed, and stretches back to its original position. The opposite happens when the triceps contract.

## **DISORDERS OF THE SKELETAL SYSTEM**

Calcium is also important in maintaining your body's pH levels, promoting alkalinity, as many health problems are the result of a much too acid state arising from the typical Western diet, which can affect your immune system (among other things). Calcium also acts as an anti-oxidant, combatting free radicals that are implicated in diseases including cancer. In particular it is thought to be helpful in protecting against colon cancer. It is also important for the proper functioning of muscles, nerves and blood.

## **OSTEOPOROSIS**

Osteoporosis is the thinning of bone tissue and loss of bone density over time.

Osteoporosis is the most common type of bone disease. About half of all women over the age of 50 will have a fracture of the hip, wrist, or vertebra (bones of the spine).

Osteoporosis occurs when the body fails to form enough new bone, when too much old bone is reabsorbed by the body, or both. Calcium and phosphate are two minerals that are essential for normal bone formation. Throughout youth, your body uses these minerals to produce bones. If you do not get enough calcium, or if your body does not absorb enough calcium from the diet, bone production and bone tissues may suffer.



# OSTEOARTHRITIS

Osteoarthritis (OA) is the most common joint disorder.

## **Causes, incidence, and risk factors**

Osteoarthritis is caused by 'wear and tear' on a joint. Cartilage is the firm, rubbery tissue that cushions your bones at the joints, and allows bones to glide over one another. Cartilage can break down and wear away. As a result, the bones rub together, causing pain, swelling, and stiffness.

Bony spurs or extra bone may form around the joint, and the ligaments and muscles around the hip become weaker and stiffer. Often, the cause of OA is unknown. It is mainly related to aging. The symptoms of OA usually appear in middle age. Almost everyone has some symptoms by age 70. However, these symptoms may be minor. Before age 55, OA occurs equally in men and women. After age 55, it is more common in women. Other factors can also lead to OA. OA tends to run in families. Being overweight increases the risk of OA in the hip, knee, ankle, and foot joints. Fractures or other joint injuries can lead to OA later in life. Long-term overuse at work or in sports can lead to OA. Medical conditions that can lead to OA include: Bleeding disorders that cause bleeding in the joint, such as hemophilia. Disorders that block the blood supply near a joint can lead to avascular necrosis. Other types of arthritis, are chronic gout, pseudo gout, or rheumatoid arthritis.

## Symptoms

Pain and stiffness in the joints are the most common symptoms. The pain is often worse after exercise and when placing weight or pressure on the joint. Your joints become stiff and harder to move over time. You may notice a rubbing, grating, or crackling sound when you move the joint. The phrase "morning stiffness" refers to the pain and stiffness people feel when they first wake up in the morning. Stiffness usually lasts for 30 minutes or less. It is improved by mild activity that "warms up" the joint. During the day, the pain may get worse with activity and feel better when you are resting. After a while, the pain may be present when you're resting. It may even wake you up at night. Some people might not have symptoms, even though x-rays show the changes of OA.

*Multiple  
Choice  
Questions*



1. Deficiency of calcium is related to the deficiency of

- A. vitamin D.
- B. vitamin C.
- C. vitamin A.
- D. vitamin E.

2. Osteoarthritis is more predominant in

- A. men.
- B. women.
- C. both men and women.
- D. children.

