

Skeletal Health and Disorders

by Sophia



WHAT'S COVERED

This lesson will give an overview of disorders and injuries of the skeletal system. Specifically, this lesson covers:

1. Review of Homeostasis

Exercise affects **bone remodeling** by increasing the amount of **calcium** deposited into bones. To illustrate that, we'll first review the concept of homeostasis in bone remodeling.

Recall that if blood calcium levels are too high, calcium will then be deposited into bones. The bones will be built stronger and denser by cells called osteoblasts. On the other hand, if calcium levels in the blood are too low, cells called osteoclasts will remove calcium from the bone and deposit it into the blood to help maintain the blood calcium level. Remember, proper blood calcium levels are necessary for the nervous system and muscular system to function properly.



BIG IDEA

Calcium has a large effect on how healthy our bones are. The more calcium that is deposited into our bones, the better, because it makes those bones stronger and denser.



TERMS TO KNOW

Bone Remodeling

The process in which calcium is recycled between the blood and bones.

Calcium

A mineral necessary for the proper development and mineralization, as well as proper nerve and muscle function.

2. Effects of Diet and Exercise

As mentioned at the beginning of this lesson, exercise increases the amount of calcium deposited into the bone. In other words, as we exercise, more calcium is deposited into bone than is withdrawn. Again, this will help bones become stronger and denser.

In addition to exercise, diet can also have an effect on the density of our bones. A diet that's high in calcium

will obviously be better. Bones will be stronger because that calcium will be deposited into them.

People who don't exercise, or maybe don't have a diet that's high in calcium, can run the risk later in life of developing diseases like osteoporosis, which occurs when the bone density levels decrease significantly. People who don't have very strong or dense bones are also at a greater risk of breaking or fracturing their bones.



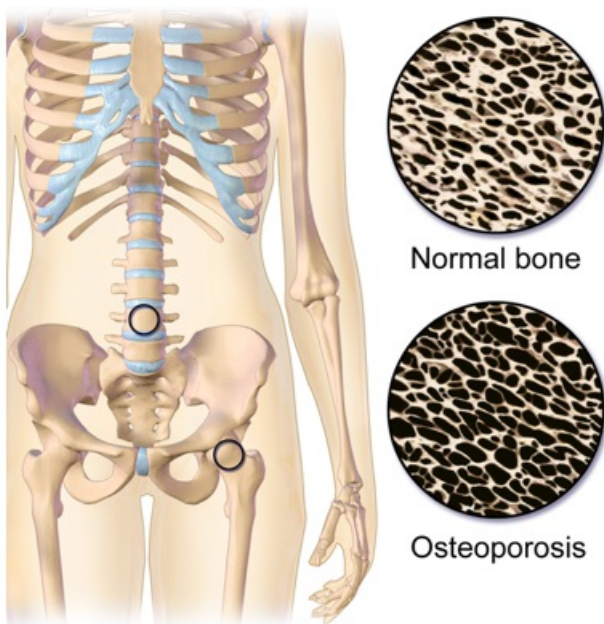
BIG IDEA

By exercising and having a diet high in calcium, you are helping your bones to become stronger and denser, avoiding the potential of different diseases later in life.

3. Common Disorders

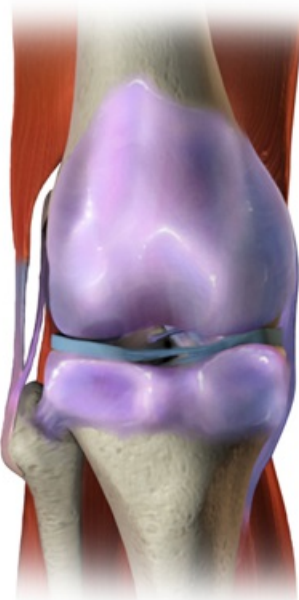
There are various disorders that affect the skeletal system. These disorders have many different causes, such as aging, overuse, lifestyle, et cetera. Here we'll discuss several common disorders and their causes.

- **Osteoporosis:** A loss of bone mass, or deterioration of bone over time. The main cause of osteoporosis is aging. Deficiencies in calcium can also contribute to this disorder. If you have a diet that is lacking in calcium, bones aren't able to stay as strong and resilient as they otherwise would, losing mass over time. A lack of regular exercise also contributes to osteoporosis. This disorder is actually most common in women who are past menopause.



- **Osteoarthritis:** A disorder where the cartilage between the joints starts to wear away. The main causes are stress on joints, disease, sports injury, obesity, and age. Osteoarthritis can be very painful because it causes the ends of the bones to rub against each other.

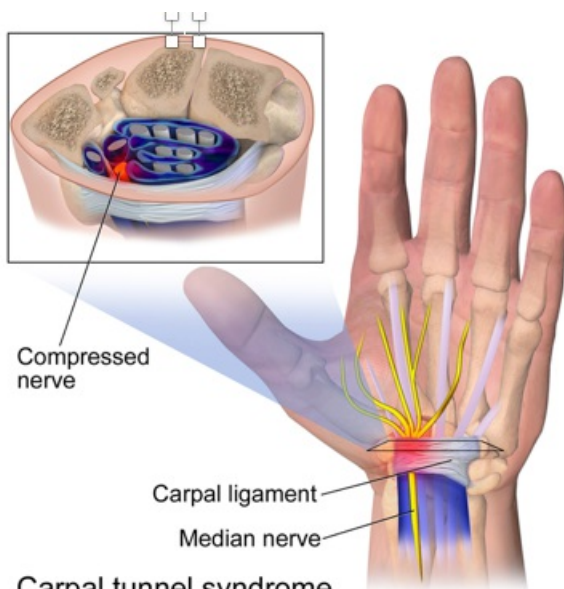
Normal Knee



Osteoarthritis



- **Carpal Tunnel Syndrome:** Occurs when the tendons of the wrist swell and press on nerves, causing pain. Carpal tunnel syndrome is common in people who work on computers because it's a repetitive motion, such as typing, that causes stress on the tendons of the wrist.



Carpal tunnel syndrome

- **Sprains, Strains and Dislocations:** These are all disorders that are caused by injury of the joints. **Sprain** is a tear in a ligament or tendon; a **strain** is when a ligament or tendon has been stretched or twisted too far; and a **dislocation** is when two bones at a joint are no longer in contact. Common causes of these types of disorders are sports injuries, overuse, and mechanical stress.
- **Breaks:** Another common disorder of the skeletal system is breaking. There is a spectrum used to classify the degree of the break. These classifications include a simple, complete, or compound fracture. Breaks are caused by sports injuries, overuse, and mechanical stress.



TERMS TO KNOW

Osteoporosis

A disorder in which the bone tissue deteriorates over time.

Osteoarthritis

The wearing away of cartilage that occurs between joints which can lead to inflammation and the formation of small protrusions on bones near the joint called bone spurs.

Carpal Tunnel Syndrome

The inflammation of tendons in the wrist which then press on surrounding nerves; caused by repeated motion.

Sprain

A torn ligament or tendon caused by overuse.

Strain

An overuse injury that stretches a tendon past its normal point.

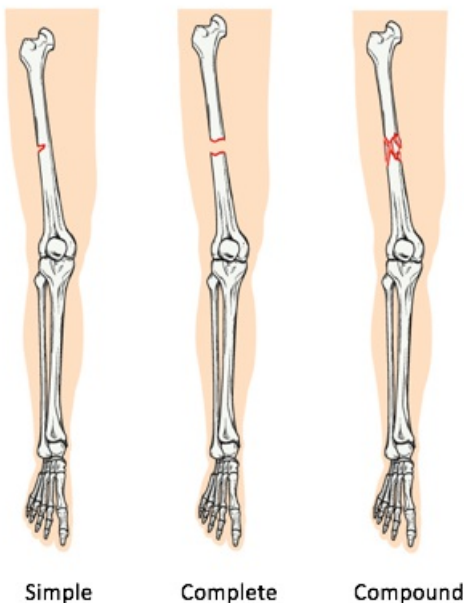
Dislocation

A disorder in which two bones of a joint are no longer in contact with each other.

4. Classifications of Breaks

Let's take a look at the different types of breaks.

- **Simple Fractures:** A small crack or break in a bone. It doesn't go through the entire bone, and there isn't any surrounding tissue damage.
- **Complete Fractures:** Occurs when the bone actually breaks into two pieces. There will be some soft tissue damage associated with this type of break.
- **Compound Fractures:** The worst type of break. Rather than cleanly breaking, as in a complete fracture, bone fragments have actually shattered. In this type of break, broken ends of the bone will generally puncture the skin and other soft tissue damage will occur.



TERMS TO KNOW

Simple Fracture

A break in which the bone is still in one piece and minimal or no tissue damage occurs.

Complete Fracture

A break in which the bone separates into two and tissue damage occurs.

Compound Fracture

A break in which the bone shatters causing a significant amount of soft tissue damage.



SUMMARY

In this lesson, you reviewed the process of **homeostasis** in bone remodeling. This is when calcium is either deposited into or removed from the bones based on the body's blood calcium levels. You then learned about the **effects that exercise and nutrition** can have on your skeletal system. The combination of exercise and a calcium-rich diet can help your bones become stronger and denser, decreasing your risk of developing diseases like osteoporosis. This has also been an overview of **common disorders** of the skeletal system, though it is not a complete list. When we break a bone, there are three **classifications of break** the injury can fall into, with simple fractures being the least complex and compound fractures being the most complex and serious. Keep up the learning and have a great day!

Source: THIS WORK IS ADAPTED FROM SOPHIA AUTHOR AMANDA SODERLIND



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