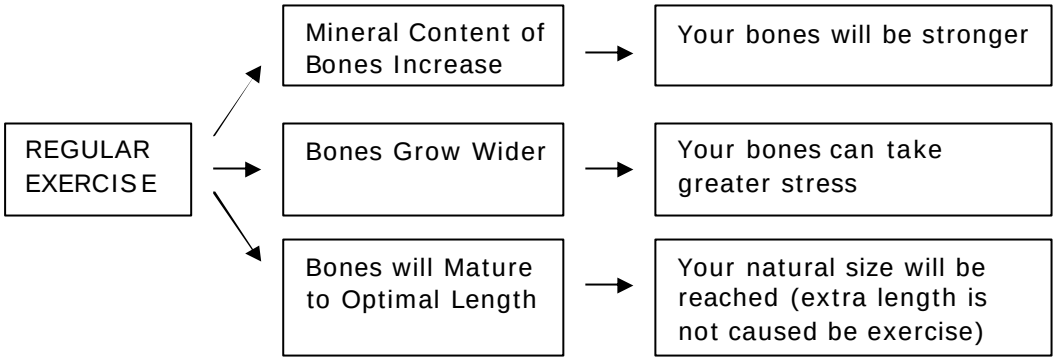
THE SKELETAL SYSTEM

FUNCTIONS OF BONES

Movement, muscle attachment, supporting framework (gives shape), protection of internal organs, storage place for body minerals, and centers for production of blood cells.



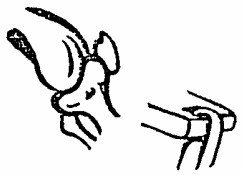
THE JOINTS

The point at which two bones meet is called a joint. Joints allow for movement of the body framework. Imagine that you did not have a joint at the point where your arm bones meet at your elbow. What activities would be impaired? We can classify joints according to the movement they allow: freely moveable, partially moveable, or immovable. The four main types of joints are..

1. **Ball and Socket Joint** – When you throw a baseball you can swing your arm in a large circle because of the ball and socket joint in your shoulder.

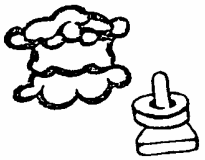
Ball and Socket Joint

2. **Hinge Joint** – When you kick your leg from the knee you use a hinge joint. A hinge joint is like a hinge that joins a door to a doorway.



Hinge Joint

3. **Pivot Joint** – When you nod your head one pivot joint moves. This joint connects your head to your neck.



Pivot Joint

4. **Gliding Joint** – When you bend over to pick up an object the gliding joints in your vertebrae are used. There are small discs or pads of cartilage that lie between these bones.

Gliding Joint

Joints that allow for wide ranges of movement are often bound together by ligaments and muscles. Ligaments are strong bands or cords of tissue that join bones or keep organs in place.

Cartilage helps to reduce the friction between bones. Cartilage is a soft, elastic material that gives form rather than rigidity. It serves as a buffer between bones, supports the nose and ears, connects ribs to the sternum, and acts as a cushion between joining vertebrae.

The cavities of joints capsules are lined with a special membrane, the synovial membrane. It secretes and fills the joint cavity with synovial fluid, which lubricates the ends of the bones within the joint. Many joints contain small sacs of the fluid called bursa, which aid in the movement of muscles over bone. The synovial membrane lines all bursas.

You may have heard of bursitis – a painful condition occurring when a bursa becomes inflamed. It is common in the knee and shoulder joints.

Injuries to the Skeletal System

Sprains and dislocations are the most common injuries of the skeletal system. They involve joints and result from too much stress being placed on a joint. If you experience a sudden blow or twist or stretch, the tissues that join the bones can weaken, pull or tear.

Bone fractures are less common but are usually more serious than sprains and dislocations.

Sprains

Have you ever stepped of a curb in the wrong way and twisted your ankle? Sprains can occur as easily as that.

A sprain, a condition caused by a violent, sudden stretching of a joint or ligament, may be accompanied by severe pain, swelling, and difficulty in moving. The swelling is caused by an increased amount of fluid entering the joint from surrounding membrane.

RICE (REST, ICE, COMPRESSION, ELEVATE)

Stay off of the injured area. Apply cold packs or ice to the sprained area. Elevate the area, if possible, to help control swelling. Cold causes the blood vessels to become narrower, lessening the internal bleeding. Elevating the injured area increases the flow of blood in the veins that lead away from the injury.

Stress on a joint can result in torn cartilage when the strong connective tissue has been pulled out from the bone. Surgery is usually required for this injury. Because it can be difficult to distinguish a sprain from a dislocation or a fracture, a health professional should check more serious sprains.

Dislocations

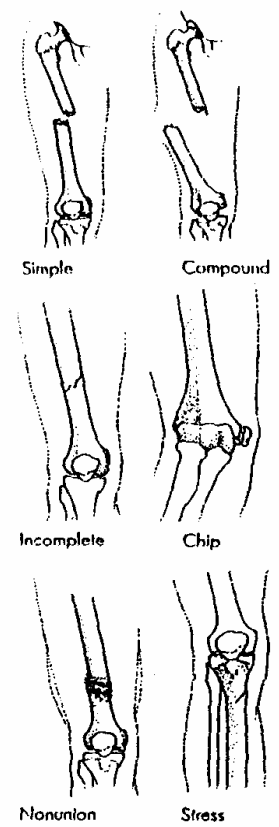
A dislocation is also a serious injury. A dislocation occurs when the end of a bone is pushed out of its joint. The ligaments holding the bones are severely stretched and may even be torn. Dislocations are usually quite painful. The joint must be set back into its normal position and held there while the surrounding tissue heals.

Never attempt to replace a dislocation yourself. Joints are surrounded by many tiny blood vessels and nerves. You risk further damage to them if you don't know what you're doing.

BONE FRACTURES

Fractures are any type of break in a bone. These types may be classified as simple, compound, incomplete, chip, nonunion, and stress. All of these fractures can be treated successfully.

- **Simple fractures.** The broken bone does not protrude (stick out) through the skin.
- **Compound fractures.** The broken bone protrudes through the skin and much blood can be lost.
- **Incomplete fractures.** The bone is cracked but not broken.
- **Chip fractures.** A piece of bone is broken off, or chipped.
- **Nonunion fractures.** The fractured bone does not heal properly. Sometimes this happens if the bone parts are not well fitted together, or if they shift.
- **Stress fractures.** A bone is strained in some way, so as to cause a weakness in it. Stress fractures happen through the repeated use of some part of the body. Sports figures and dancers are frequently victims of stress fractures in the legs and feet.



Bone Disorders and Diseases

Bone disorders and injuries to the bones are the result of many factors, Including sports and recreational mishaps, viral infections, and poor posture.

Osteomyelitis

Osteomyelitis is a term given to many kinds of inflammation of the soft inner surface of the bones. Many times, this inflammation is caused by a virus. In the past, osteomyelitis was a serious condition that required surgery to correct. Today, antibiotics, such as penicillin are able to cure the infected bones.

Osteoporosis

Osteoporosis results from a low calorie and calcium diet. The person does not have enough nourishment to sustain the proper growth of the bones. Elderly people, especially women, are prone to the disorder. Drinking milk and eating a balanced diet are important in containing the illness.

Leukemia

Leukemia is caused by cancer cells that attack marrow of the bone. Marrow is the blood - forming matter inside the bones. The cancer keeps the marrow cells in an immature state, so that red and white blood cells and platelets are not produced in the quantities needed.

Leukemia can result in:
• anemia and a general tired feeling resulting from lack of red blood cells;
• abnormal bleeding from cuts or bruises, resulting from insufficient platelets to help clot the blood in a cut:
• general openness to infection, since the white blood cells that act as antibodies are under produced.

There are a number of types of leukemia, but all center around the marrow and the way the cancer affects it. The causes of the disease are largely unknown. Some subtypes of the disease seem to be genetic, that is passed on to offspring. Others may be traced to a virus. The disease and its type are determined by examining the bone marrow itself. Leukemia sufferers are mostly children, and while there is treatment through certain drugs and radiation which may slow down the growth, the death rate is still high. More research is going on in the search for cures to leukemia and its subtypes. Marrow transplants have been very successful for some types of leukemia.