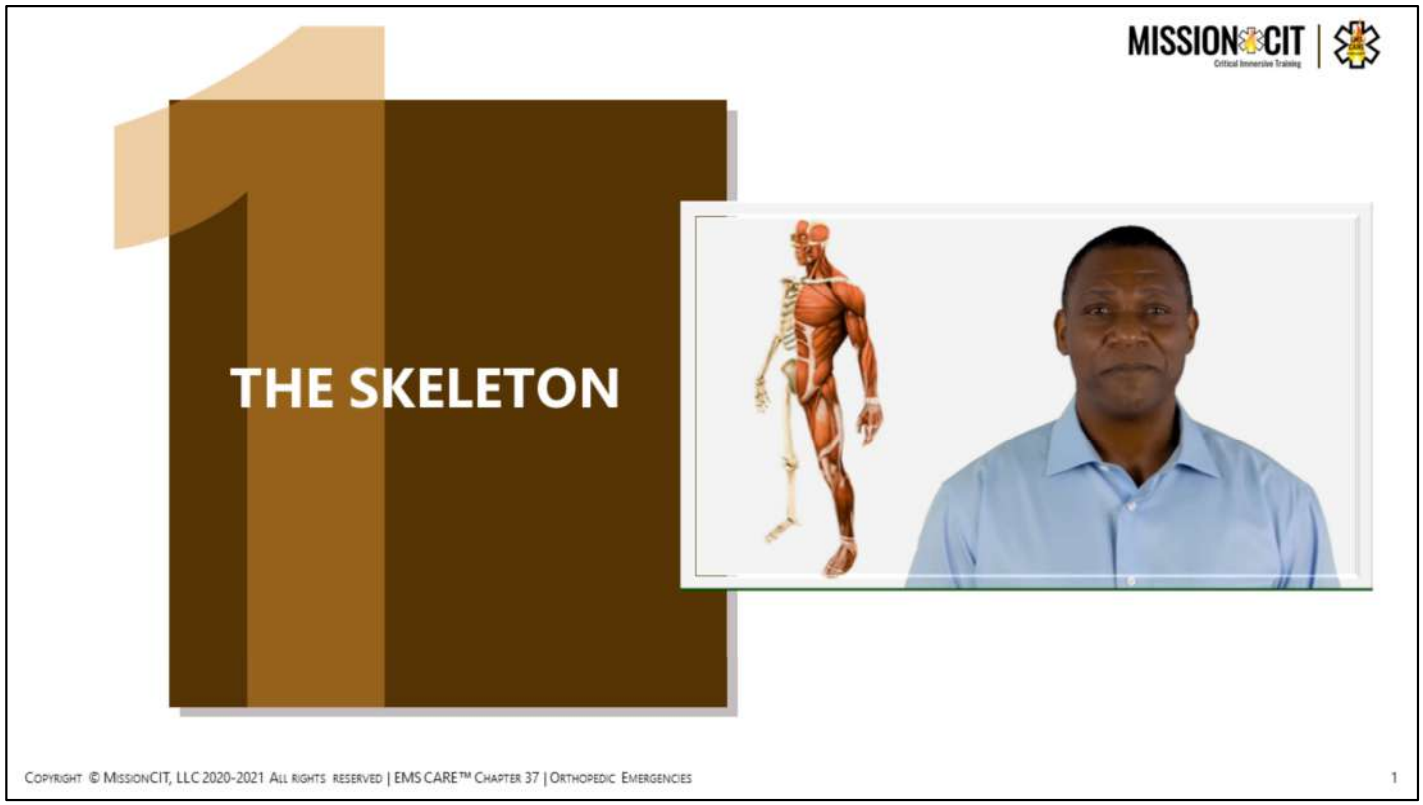
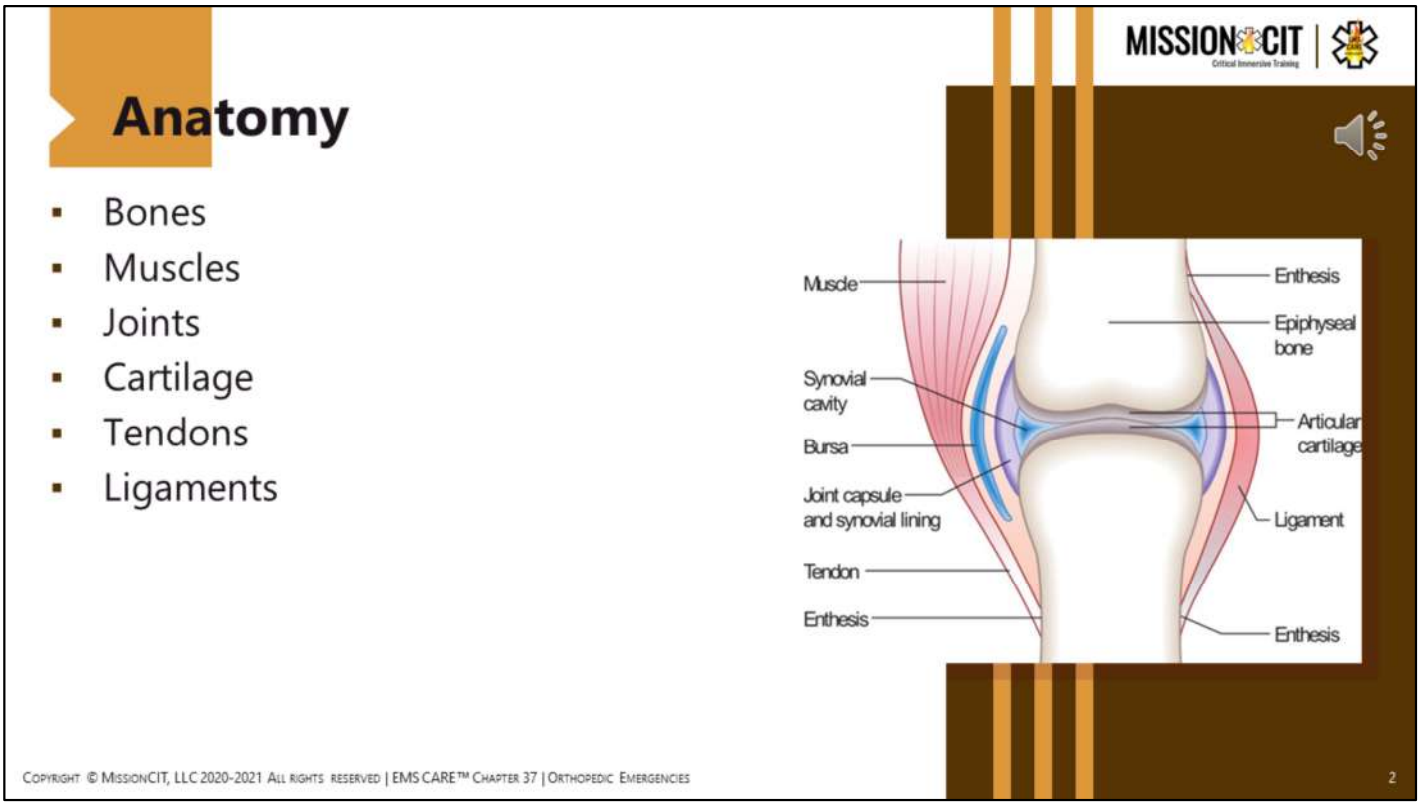


Hello everyone. Welcome to this course on Orthopedic Injuries.

Also known as musculoskeletal injuries, these are some of the most common reasons for patients to seek medical attention.

From a medical care standpoint, these injuries are easy to identify because of the associated pain, swelling, and deformity. Many times, it can lead to short-term or long-term deformities as well.

Before we get to the injuries, it's important to know the skeleton, so you know what bones and joints are located where.



The musculoskeletal system of our body comprises bones, joints, cartilage, and muscles. Bones are the framework for our body and give it the structure and shape we know. Joints, on the other hand, are the place where two or more bones meet, and they facilitate bending. Finally, the muscles are responsible for the movement.

Bones are of four shapes and sizes, and they are long, short, flat, sesamoid, and irregular. The flat bones protect the internal organs, long bones support weight and facilitate movement, short bones are located in the wrists and ankles for rotational movement, irregular bones protect specific areas such as the pelvic region and spinal cord, and sesamoid bones reinforce tendons respectively.

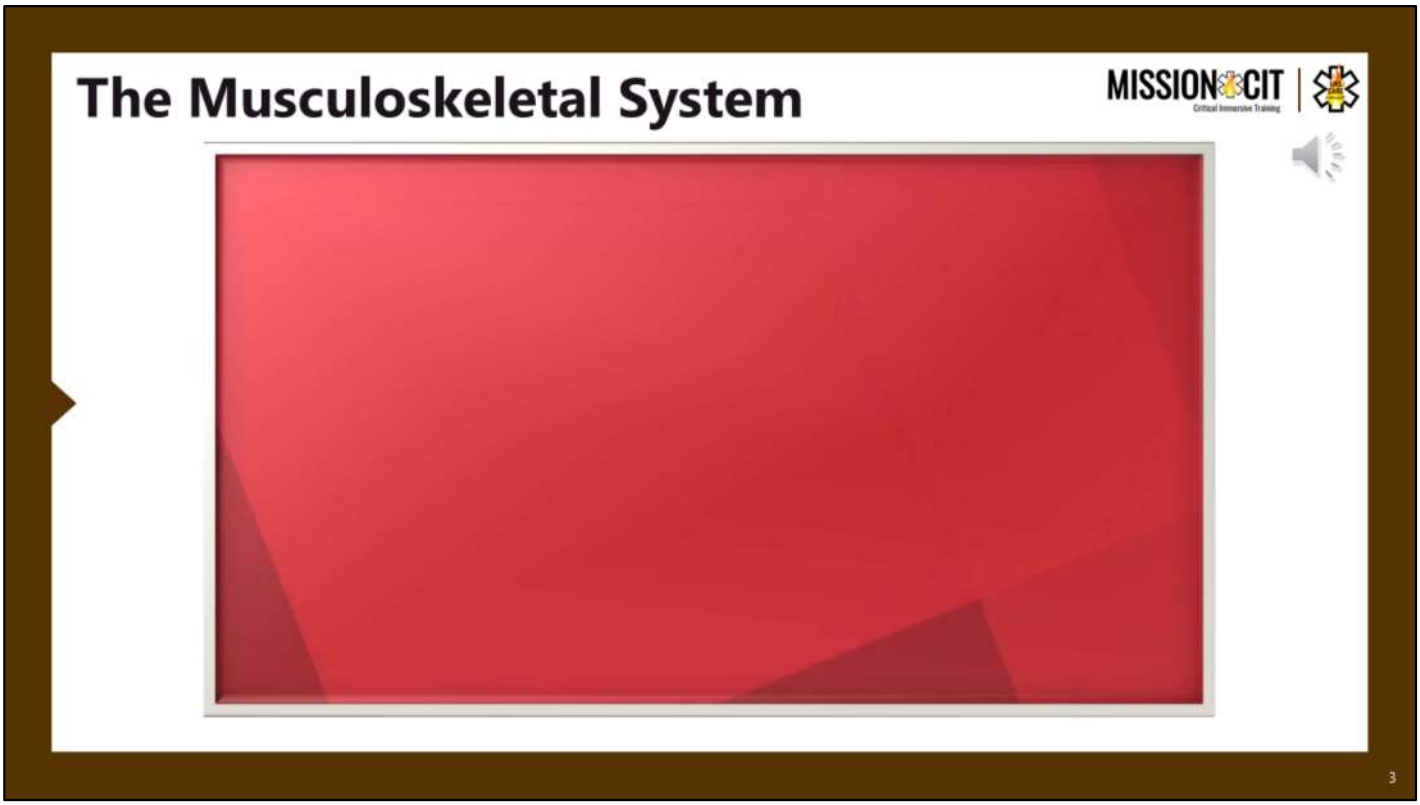
While bones are hard, muscles are a type of flexible elastic tissue that support movement. The muscles are attached to the bones by tendons and work in tandem with bones to facilitate different movements.

There are many kinds of muscles and the ones that we will talk about in this lesson are skeletal muscles. They are also called voluntary muscles because they are under the direct control of the brain. These muscles also make up the largest portion of the body's mass.

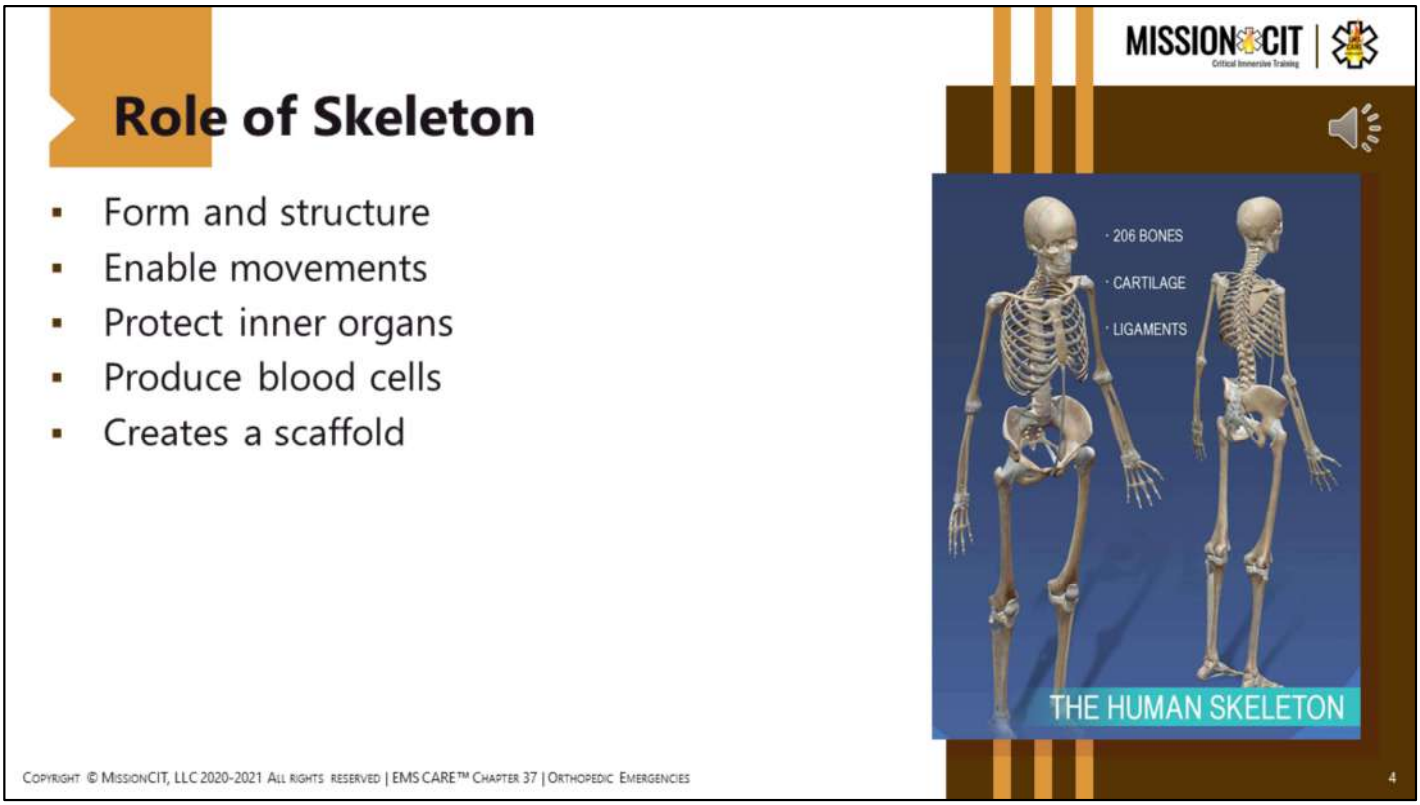
Further, all skeletal muscles have arteries, veins, and nerves that provide blood and nutrients, and also make it easy to communicate with the brain.

Cartilage is a firm tissue that's softer than bones and provides flexibility for movements.

Besides these broad structures, some components act as connectors. They are ligaments and tendons. While ligaments connect one bone to another, tendons connect a muscle to a bone.



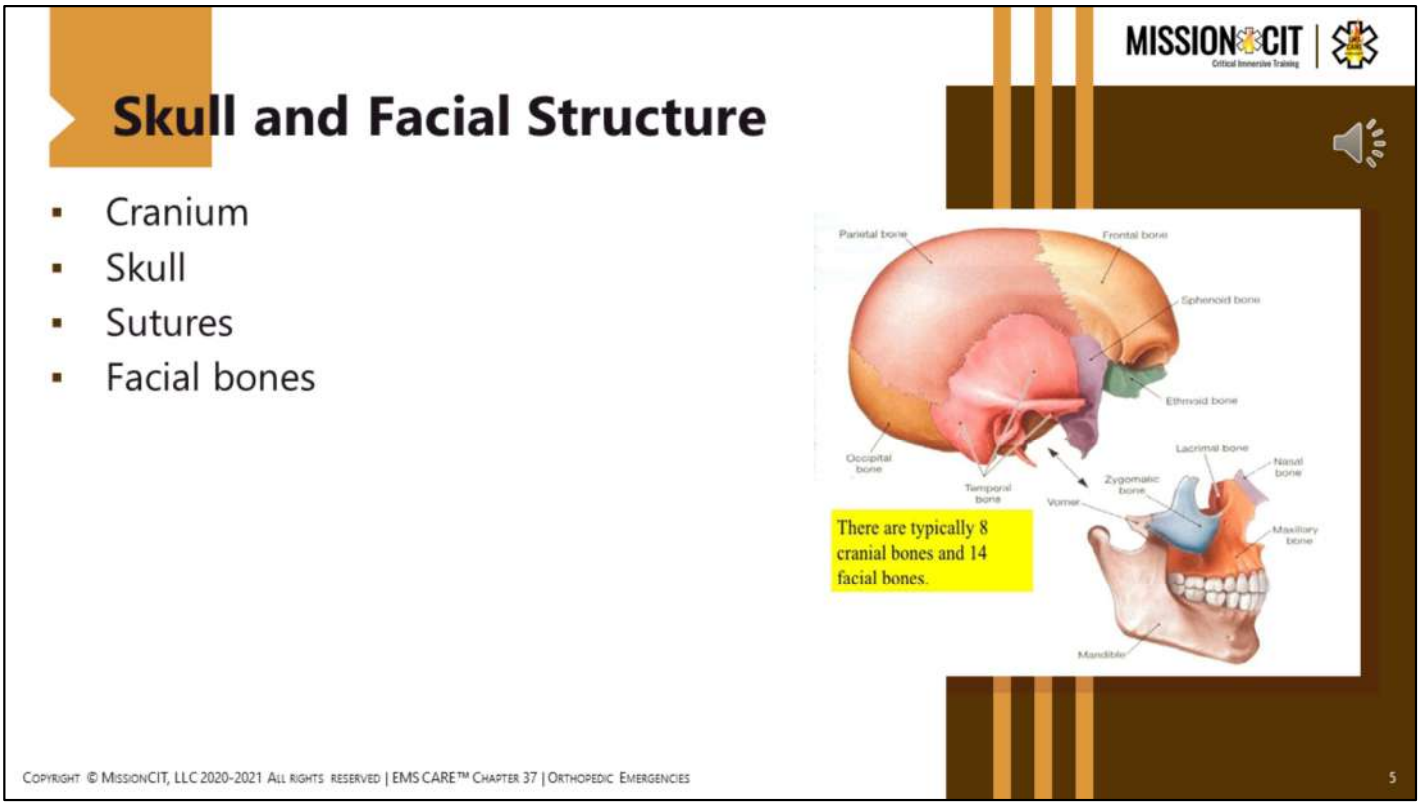
The musculoskeletal system includes the bones, joints, and connective tissues. Connective tissues include the muscles and the connecting structures such as ligaments and tendons. Damage causing osteoarthritis begins in the cartilage around joints. Bone is continually formed and broken down and depends on vitamin D and calcium stores. Aging, gout, and disorders can affect the musculoskeletal system. Learn more about the musculoskeletal system from this video.



Skeleton is a system of bones that gives us a recognizable form and structure. They also enable movements and protect our inner organs from injuries. These bones are also responsible for producing blood cells.

There are 270 bones at the time of birth, and as you grow, the bones fuse to decrease to 206 at the time of adulthood.

It is supplemented by ligaments, tendons, cartilage, and muscles to create a scaffold.

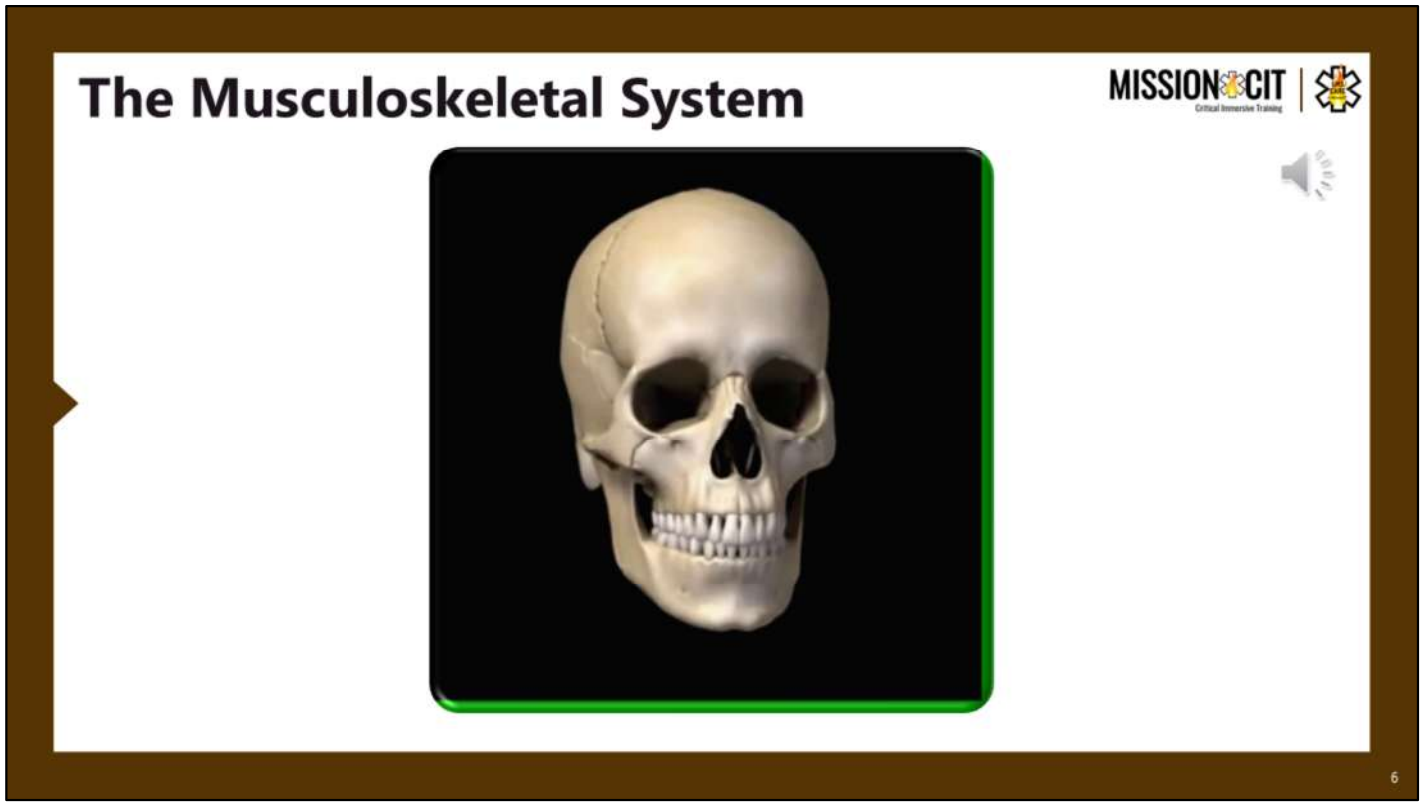


The cranium of the skull is the skeletal structure of the head that supports the face and protects the brain. It is broadly divided into facial bones and braincases. The facial bones underlie the facial structures, form the nasal cavity, enclose the eyeballs, and support the teeth of the upper and lower jaws. The rounded brain case surrounds and protects the brain and houses the middle and inner ear structures.

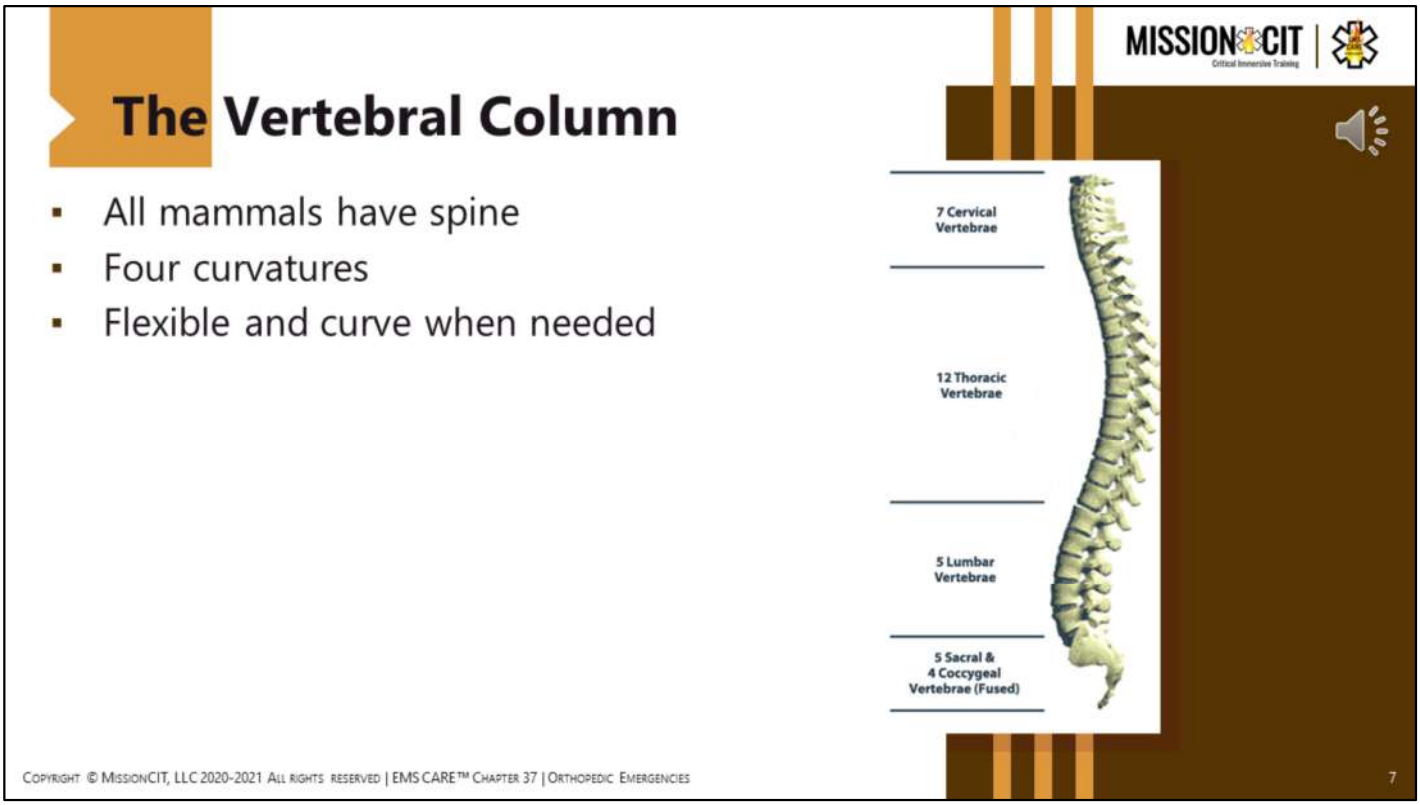
In the adult, the skull consists of 22 individual bones, 21 of which are immobile and united into a single unit. The 22nd bone is the mandible or the lower jaw, which is the only moveable bone of the skull.

A suture is an immobile joint between adjacent bones of the skull. The narrow gap between the bones is filled with dense, fibrous connective tissue that unites the bones. The long sutures located between the bones of the braincase are not straight, but instead follow irregular, tightly twisting paths. These twisting lines serve to tightly interlock the adjacent bones, thus adding strength to the skull for brain protection.

The facial bones of the skull form the upper and lower jaws, the nose, nasal cavity, and nasal septum, and orbit. The facial bones include 14 bones, with six paired bones and two unpaired bones.



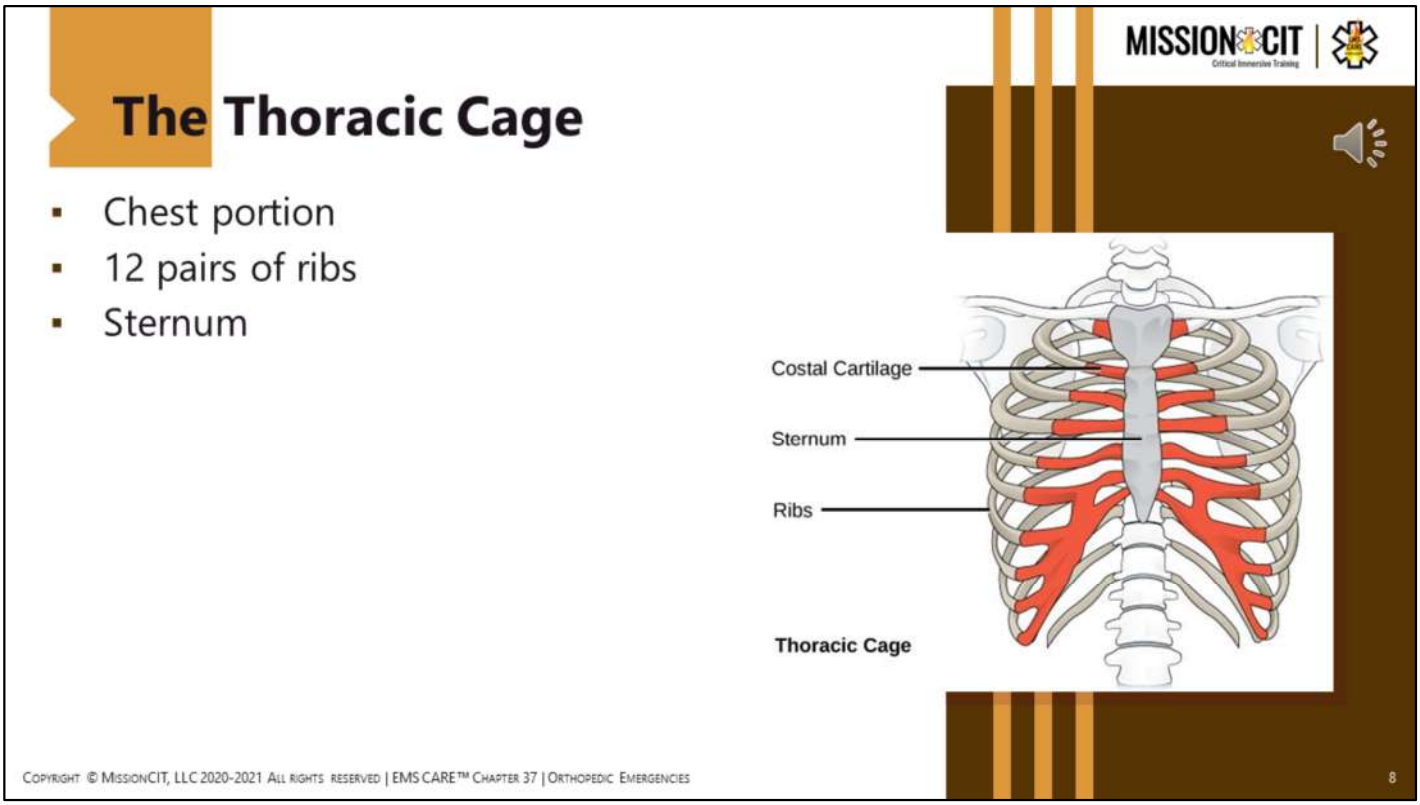
Here is a video explaining the cranial and facial bones of the skull.



The vertebral column, or the spine, is present in all mammals including human beings. The adult vertebral column does not form a straight line but instead has four curvatures along its length – cervical, thoracic, lumbar, and pelvic.

These curves increase the vertebral column's strength, flexibility, and ability to absorb shock. When the load on the spine is increased, by carrying a heavy backpack, for example, the curvatures increase in depth, that is they become more curved, to accommodate the extra weight. They then spring back when the weight is removed.

Developmental anomalies, pathological changes, or obesity can enhance the normal vertebral column curves, resulting in the development of abnormal or excessive curvatures.

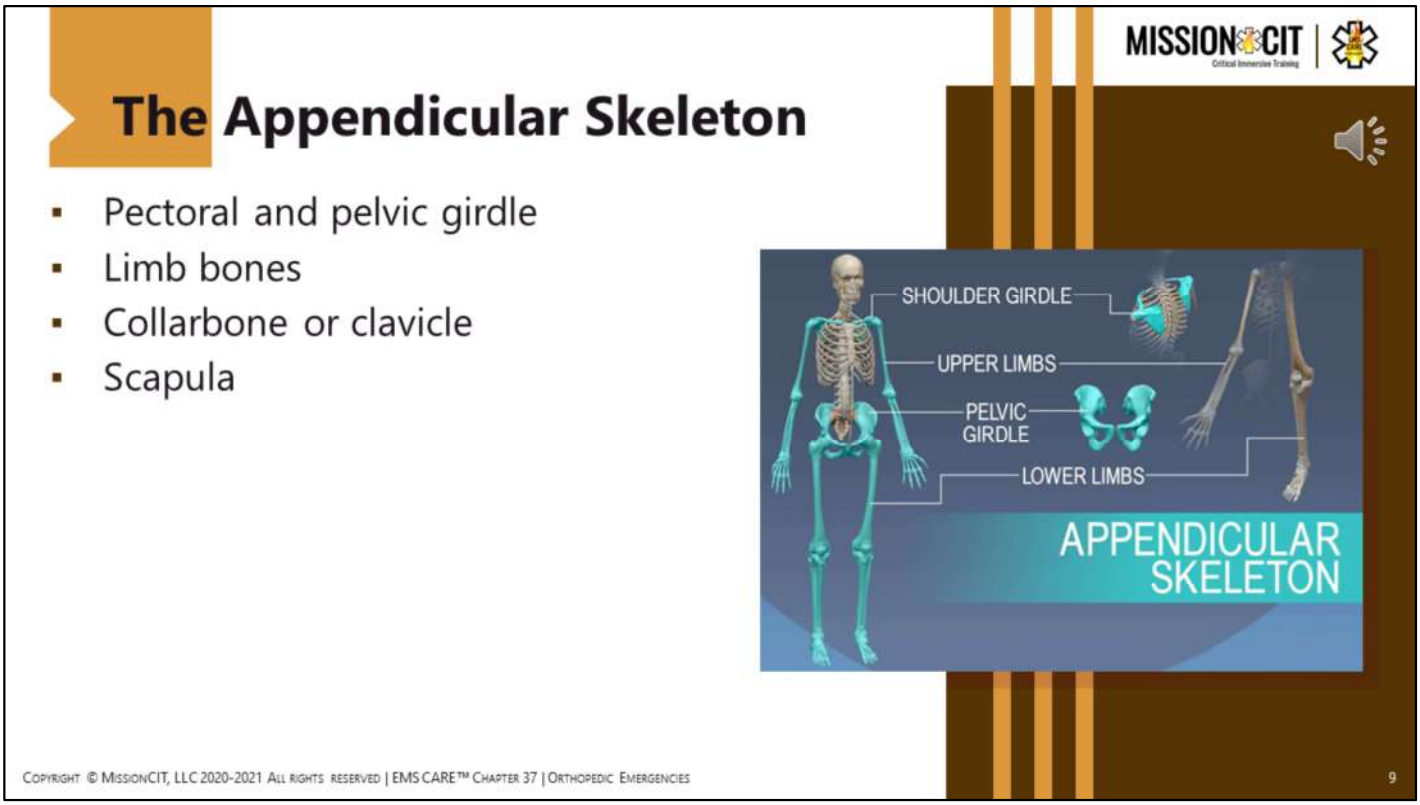


The thoracic cage, also called the rib cage, forms the thorax or chest portion of the body. It consists of 12 pairs of ribs with their costal cartilages and the sternum. The ribs are anchored posteriorly to the 12 thoracic vertebrae.

The thoracic cage protects the heart and lungs. It consists of,

- Sternum - The sternum is the elongated bony structure that anchors the anterior thoracic cage.
- Ribs - Each rib is a curved, flattened bone that contributes to the wall of the thorax. The ribs articulate posteriorly with the T1–T12 thoracic vertebrae, and most attach anteriorly via their costal cartilages to the sternum. There are 12 pairs of ribs. The ribs are numbered 1–12 in accordance with the thoracic vertebrae. The last two ribs are also called floating ribs (vertebral ribs). These are short ribs that do not attach to the sternum at all. Instead, their small costal cartilages terminate within the musculature of the lateral abdominal wall.

The skull, vertebral column, and the thoracic cage together are called the axial skeleton.



The appendicular skeleton consists of the pectoral and pelvic girdles, the limb bones, and the bones of the hands and feet.

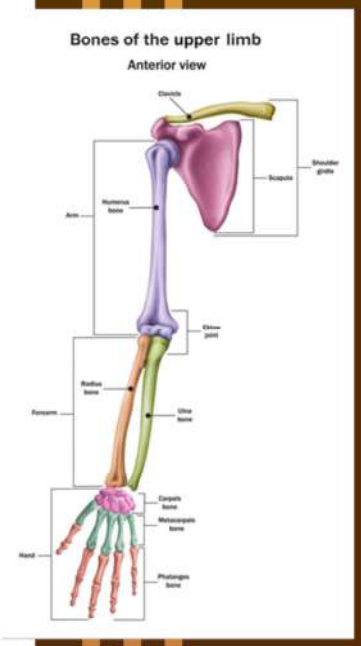
It includes all the limb bones, plus the bones that unite each limb with the axial skeleton. The bones that attach each upper limb to the axial skeleton form the pectoral or the shoulder girdle. This consists of two bones, the scapula, and the clavicle.

The collarbone or the clavicle is an S-shaped bone located on the anterior side of the shoulder. It is attached on its medial end to the sternum of the thoracic cage, which is part of the axial skeleton. The lateral end of the clavicle joins with the scapula just above the shoulder joint. You can easily palpate, or feel with your fingers, the entire length of the clavicle.

The scapula or the shoulder blade lies on the posterior aspect of the shoulder. It is supported by the clavicle, which also articulates with the humerus or arm bone to form the shoulder joint. The scapula is a flat, triangular-shaped bone with a prominent ridge running across its posterior surface.

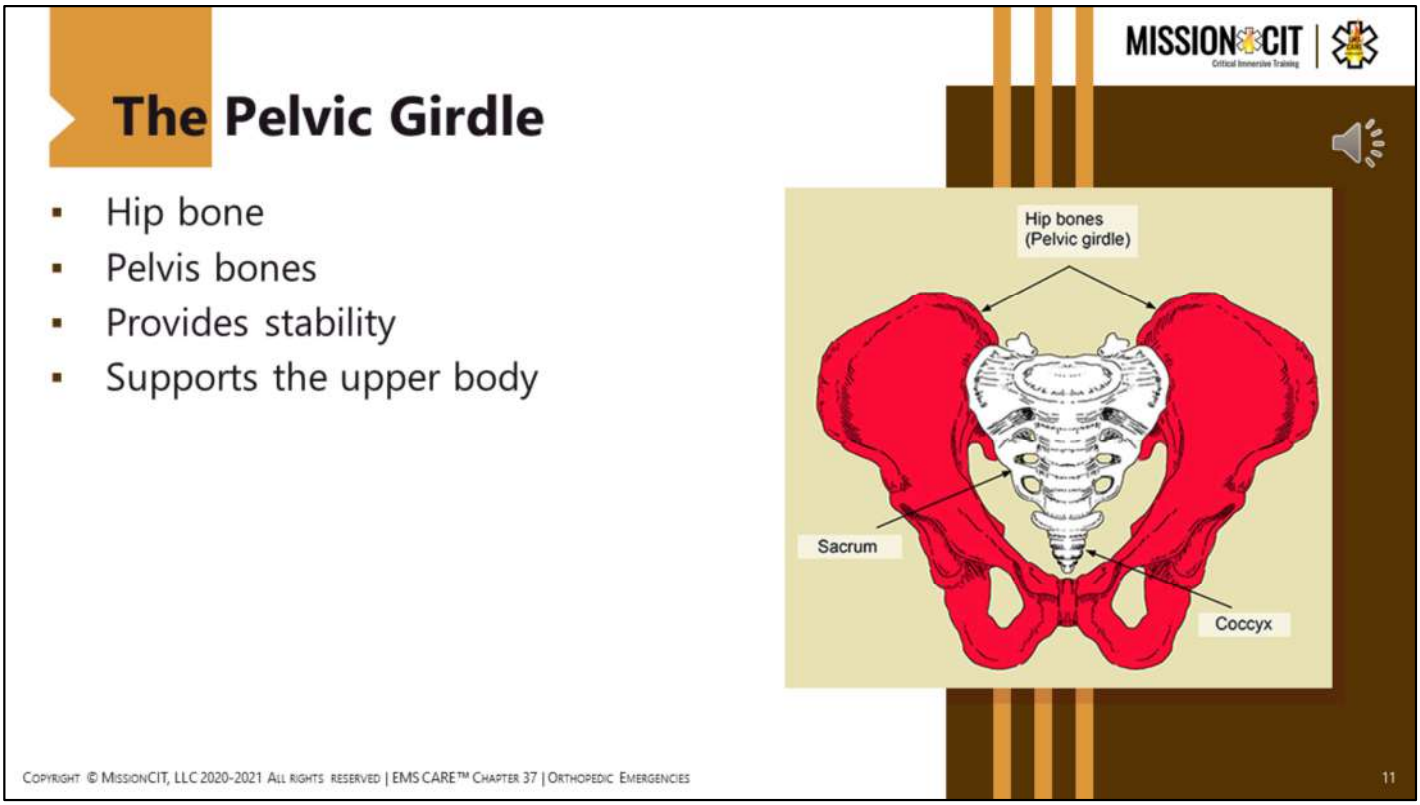
Upper Limb

- 3 regions
- 30 bones – Upper limb:
  - ✓ Humerus
  - ✓ Ulna
  - ✓ Radius
  - ✓ Carpal
  - ✓ Metacarpal
  - ✓ Phalanx



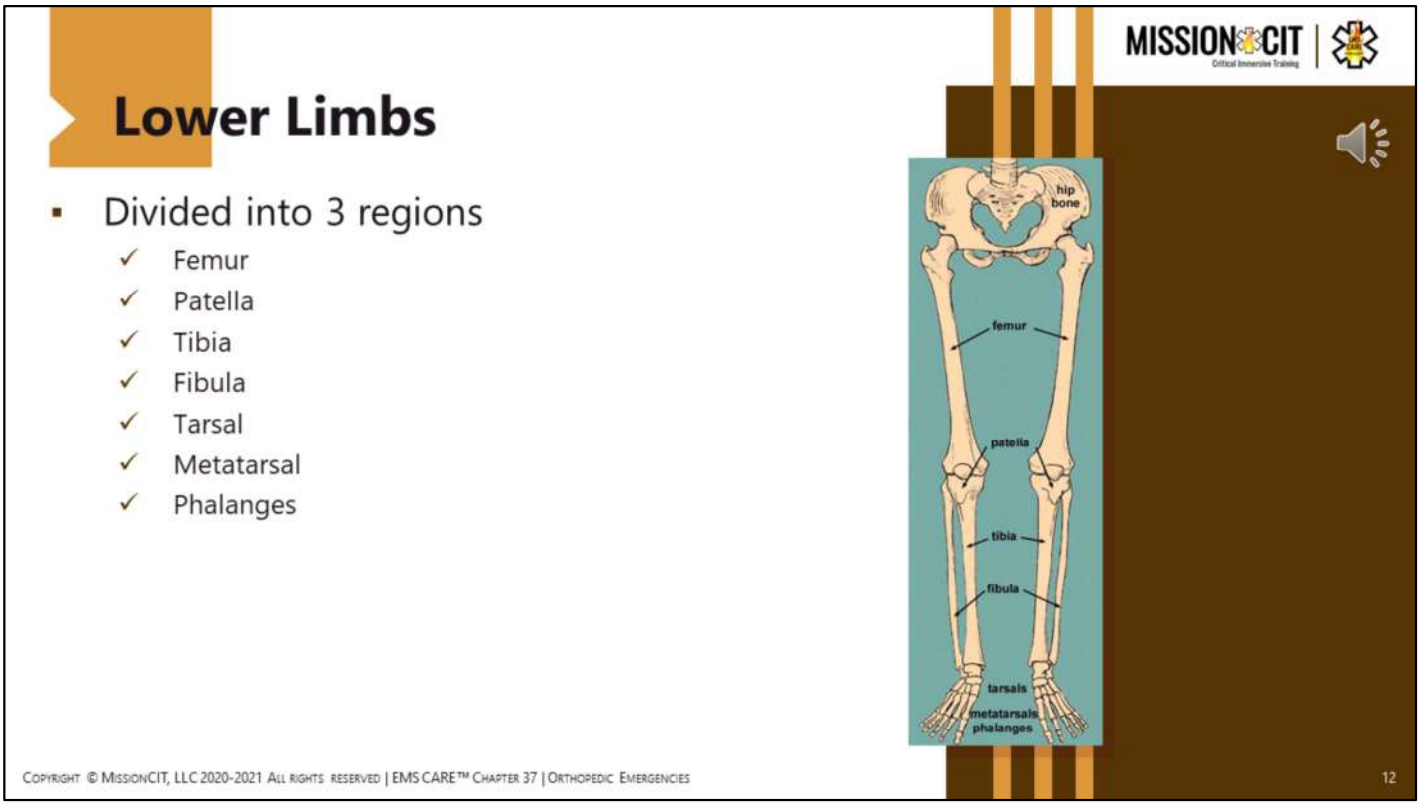
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The upper limb is divided into three regions. These consist of the arm, located between the shoulder and elbow joints; the forearm, which is between the elbow and wrist joints; and the hand, which is located distal to the wrist. There are 30 bones in each upper limb. The humerus is the single bone of the upper arm, and the ulna and the radius are the paired bones of the forearm. The base of the hand contains eight bones, each called a carpal bone, and the palm is formed by five bones, each called a metacarpal bone. The fingers and thumb contain a total of 14 bones, each of which is a phalanx bone of the hand.



The pelvic girdle or the hip girdle is formed by a single bone, the hip bone, which serves as the attachment point for each lower limb. Each hip bone, in turn, is firmly joined to the axial skeleton via its attachment to the sacrum of the vertebral column. The right and left hip bones also converge anteriorly to attach. The bony pelvis is the entire structure formed by the two hip bones, the sacrum, and, attached inferiorly to the sacrum, the coccyx.

Unlike the bones of the pectoral girdle, which are highly mobile to enhance the range of upper limb movements, the bones of the pelvis are strongly united to each other to form a largely immobile, weight-bearing structure. This is important for stability because it enables the weight of the body to be easily transferred laterally from the vertebral column, through the pelvic girdle and hip joints, and into either lower limb whenever the other limb is not bearing weight. Thus, the immobility of the pelvis provides a strong foundation for the upper body as it rests on top of the mobile lower limbs.



Like the upper limb, the lower limb is divided into three regions. The thigh is that portion of the lower limb located between the hip joint and knee joint. The leg is specifically the region between the knee joint and the ankle joint. Distal to the ankle is the foot. The lower limb contains 30 bones. These are the femur, patella, tibia, fibula, tarsal bones, metatarsal bones, and phalanges.

The femur is the single bone of the thigh. The patella is the kneecap and articulates with the distal femur. The tibia is the larger, weight-bearing bone located on the medial side of the leg, and the fibula is the thin bone of the lateral leg. The bones of the foot are divided into three groups. The posterior portion of the foot is formed by a group of seven bones, each of which is known as a tarsal bone, whereas the mid-foot contains five elongated bones, each of which is a metatarsal bone. The toes contain 14 small bones, each of which is a phalanx bone of the foot.

We hope you now have a firm idea of the skeleton and its different bones. Let’s now move to the possible injuries.