Musculoskeletal Anatomy: Bones, Ligaments, and Tendons
Video Transcript

Welcome to the AFLCA Exercise Theory video series supplementing Chapter 7, basics of anatomy. In this video, we are going to answer the question “what is anatomy” and introduce some elements of the musculoskeletal system, specifically bones, ligaments, and tendons.

Anatomy is the study of the structure of the human body. The musculoskeletal system is made up of muscles, bones, and connective tissues, such as tendons, ligaments, and other joint structures. Biomechanics refers to how the musculoskeletal system works to produce movement.

It is important for fitness leaders to have a good knowledge of musculoskeletal anatomy and biomechanics, in order to plan and deliver high quality exercise programs that are balanced, safe, and functional.

There are 206 bones in the human body. In the context of exercise, bones provide attachment for muscles and connective tissues. The entire skeleton is a lever system for body movement.

The spine is important for supporting the body in upright posture. It consists of 26 vertebrae divided into five sections. There are 7 cervical (or neck) vertebrae. There are 12 thoracic (or mid back) vertebrae. These are where the ribs attach. There are 5 lumbar (or low back) vertebrae. The sacrum is a triangular bone that joins the pelvis. It is five bones that are fused together. The coccyx (or tailbone) consists of 4 or 5 small bones fused together.

Here are some of the bones that are relevant for fitness leaders.

- Clavicle (or collarbone).
- Sternum (or breastbone). It protects the heart.
- Ribs.
- Pelvis.
- Humerus (or upper arm bone).
- Radius and ulna (or lower arm bones). The radius is the one that adjoins the thumb.
- Femur (or thigh bone).
- Patella (or kneecap).
- Tibia and fibula (or lower leg bones). The tibia is the shin, and the fibula is a thinner bone behind it.

Ligaments are bands of fibrous tissue that connect bones together at joints. Their function is to stabilize joints by preventing movement beyond the normal range of motion or along an undesired plane. This is important for preventing injury. This is an image of three important ligaments crossing the knee joint.

Tendons consist of connective tissue that is continuous with the muscle sheath and attaches muscle to bone. For example, the gastrocnemius (or calf) muscle is attached to the heel by the large and strong Achilles tendon.

Not all muscles attach to bones by tendons. Some have fleshy attachments where the muscle fibers are directly affixed to the bone, usually over a wider area. This wide attachment helps distribute force. The trapezius muscle is an example of a fleshy attachment.

This video provided brief definitions of anatomy and biomechanics, and described some components of the musculoskeletal system, specifically bones, ligaments, and tendons. Be sure to check out the other videos and resources that are part of this online learning module supplementing the AFLCA Exercise Theory manual. Thanks for watching.