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Learning Objectives

- Describe the structure of skeletal muscle.
- Explain how skeletal muscles move bones.

How do your bones move?

By the contraction and extension of your skeletal muscles. Notice how the muscles are attached to the bones. The muscles pull on the bones, causing movement.

Skeletal Muscles

There are well over 600 skeletal muscles in the human body, some of which are identified in Figure 1.1. Skeletal muscles vary considerably in size, from tiny muscles inside the middle ear to very large muscles in the upper leg.

Structure of Skeletal Muscles

Each skeletal muscle consists of hundreds or even thousands of skeletal muscle fibers. The fibers are bundled together and wrapped in connective tissue, as shown Figure 1.2. The connective tissue supports and protects the delicate muscle cells and allows them to withstand the forces of contraction. It also provides pathways for nerves and blood vessels to reach the muscles. Skeletal muscles work hard to move body parts. They need a rich blood supply to provide them with nutrients and oxygen and to carry away their wastes.

MEDIA

Click image to the left or use the URL below.
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FIGURE 1.1
Skeletal Muscles. Skeletal muscles enable the body to move.

FIGURE 1.2
Skeletal Muscle Structure. A skeletal muscle contains bundles of muscle fibers inside a “coat” of connective tissue.
Skeletal Muscles and Bones

Skeletal muscles are attached to the skeleton by tough connective tissues called tendons (see Figure 1.2). Many skeletal muscles are attached to the ends of bones that meet at a joint. The muscles span the joint and connect the bones. When the muscles contract, they pull on the bones, causing them to move.

Muscles can only contract. They cannot actively extend, or lengthen. Therefore, to move bones in opposite directions, pairs of muscles must work in opposition. For example, the biceps and triceps muscles of the upper arm work in opposition to bend and extend the arm at the elbow (see Figure 1.3). What other body movements do you think require opposing muscle pairs?

Use It or Lose It

In exercises such as weight lifting, skeletal muscle contracts against a resisting force (see Figure 1.4). Using skeletal muscle in this way increases its size and strength. In exercises such as running, the cardiac muscle contracts faster and the heart pumps more blood. Using cardiac muscle in this way increases its strength and efficiency. Continued exercise is necessary to maintain bigger, stronger muscles. If you don’t use a muscle, it will get smaller and weaker—so use it or lose it.

Summary

- Skeletal muscles are attached to the skeleton and cause bones to move when they contract.

Review

1. What is a muscle fiber?
2. What is the function of skeletal muscle?
3. How are skeletal muscles attached to bones?
4. Explain why many skeletal muscles must work in opposing pairs.
FIGURE 1.3
Triceps and biceps muscles in the upper arm are opposing muscles.

FIGURE 1.4
This exercise pits human muscles against a force. What force is it?

References

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