Sports Medicine 15

Unit I: Anatomy

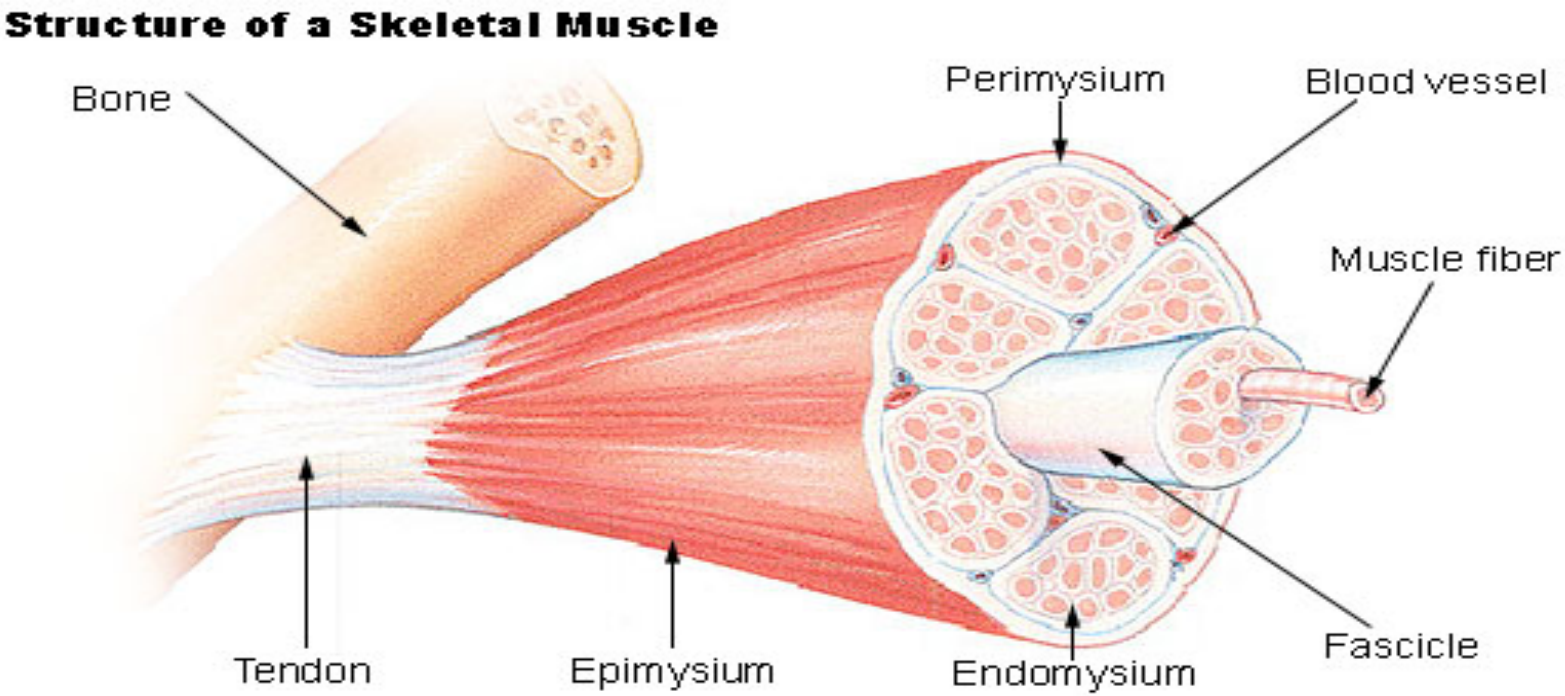
Part 2 Muscular System Overview

By Andrew Morgan BPE/BEd

Anatomy – Muscular System

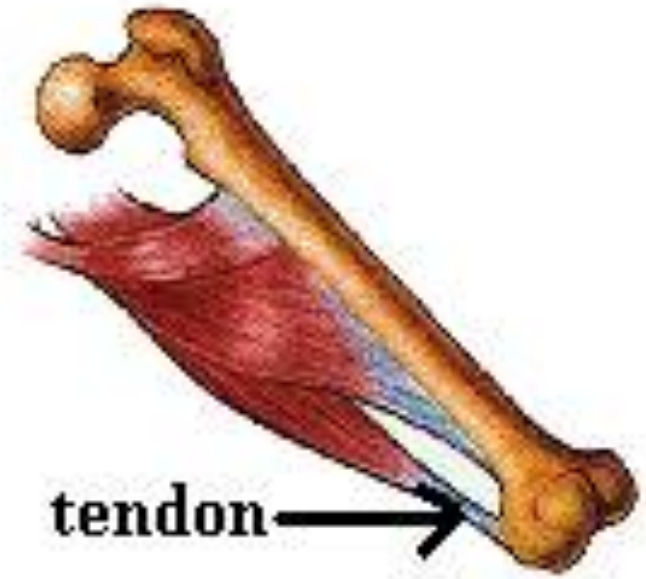
- To review Muscle tissue is categorized into 3 types: Smooth (involuntary), Skeletal (voluntary) and Cardiac (involuntary)
- For the purpose of this course we focus on the skeletal musculature.
- There are over 600 muscles in the body
- **Muscles shorten and lengthen to produce.**
- Muscle physiology is covered in Sports Medicine 25.

Anatomy – The Muscular System



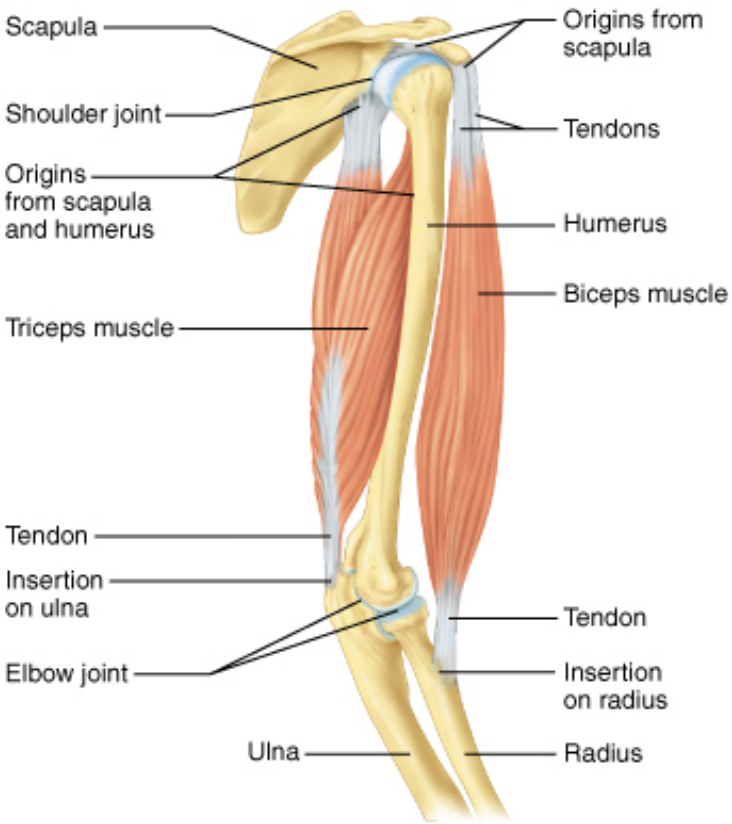
Anatomy

- Tendons:
- **Tendons are connective tissue that attach muscles to bone** and are located outside the articular (joint) capsule.
- *Very extensible and elastic*, but not *contractile*, nor or they as elastic as ligaments.



Anatomy

- To cause the body to move or generate force against external objects, both ends of each skeletal muscle must be attached by connective tissue
- Usually the **proximal attachment** (toward the center of the body) is called the **muscle origin**, whereas the **distal attachment** (away from the center of the body) is called the **muscle insertion.**



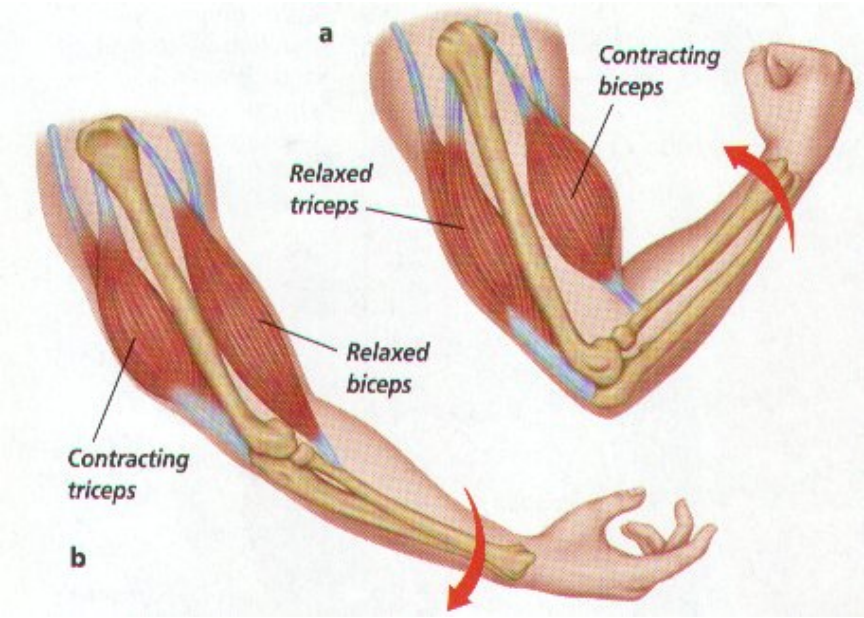
(a) Origin and insertion of skeletal muscle

Anatomy

- *In most cases muscle extends across one or ore joints and causes rotation about the joint(s) when it contracts.*
- For example a **straight line movement of the foot** is effected by **rotations** about the **knee and hip**

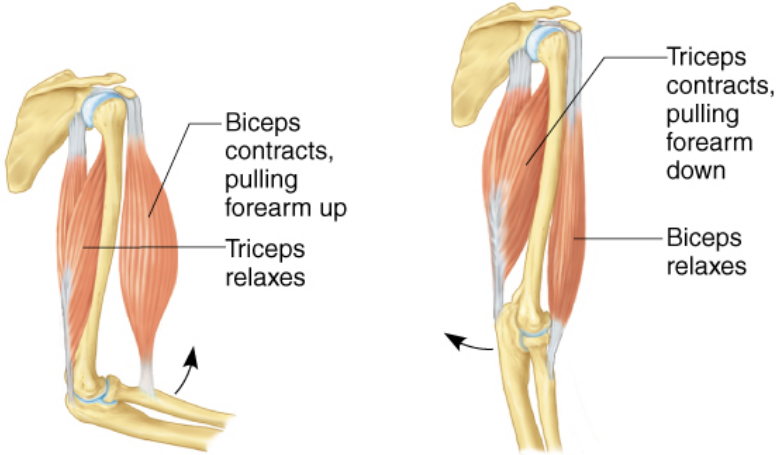
Anatomy

- Virtually all body movements involve the action of more than one muscle. The muscle most directly involved in bringing about movement is called the **prime mover, or agonist.**



Anatomy

- A muscle that can slow down or stop movement is called the **antagonist.**
- The antagonist assists in *joint stabilization* and in braking the limb towards the end of a fast movement protecting ligaments and cartilage joint structures from *sustaining injury*



(b) Movement of the forearm

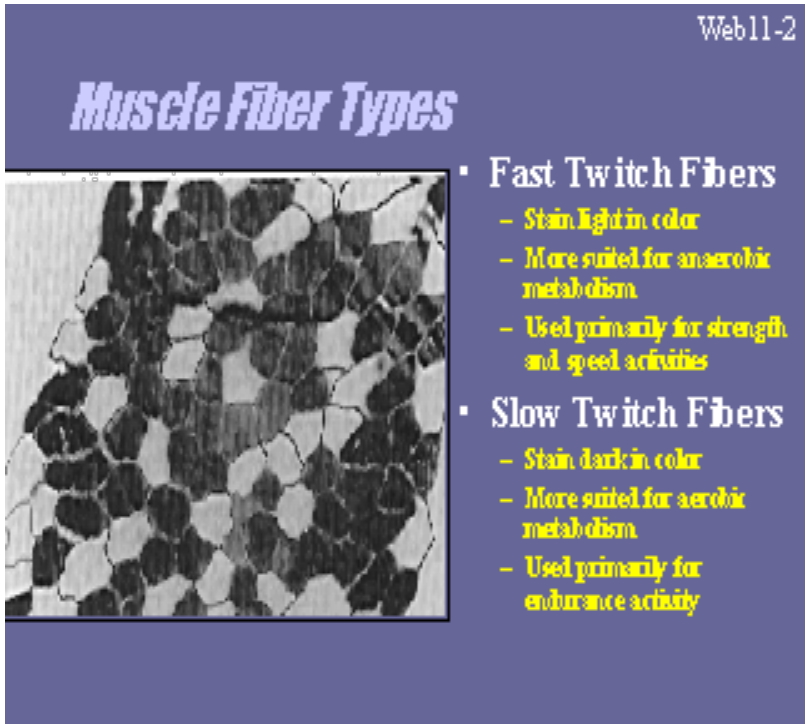
Anatomy

- A muscle is called a synergist when it assists directly in a movement

- Which muscles help when performing a Push up?
- A Chin up?

Anatomy

- The are two primary types of skeletal muscle, which are commonly known as **fast-twitch and slow-twitch fibers.** Most muscles contain both types of fibers, but depending on *heredity*, *function*, and, to a lesser degree, *training*, some muscles contain more of one type of fiber than another.



Anatomy – Proportion of Type II Fibers in Athletes Who perform Anaerobic activities

Type of athlete	**Type II (fast twitch) fibers**
Bodybuilders	44%
Javelin Throwers	50%
800m runners	52%
Weightlifters	60%
Shot-putters	62%
Discus throwers	62%
Sprinters	64%

Anatomy – The Muscular System