

# Muscle Mechanics

Muscles perform several functions in the body. They provide motion, create stability and sturdiness, generate heat, and move substances through the body. Muscle tissues have four characteristics that make them efficient:

- 1) **Excitability**- the ability of muscle tissue to receive and respond to stimuli.
- 2) **Contractility**- the ability of a muscle to shorten or thicken.
- 3) **Extensibility**- the ability of the muscle to stretch.
- 4) **Elasticity**- the ability of the muscle to return to its original shape after contracting or extending.

The condition or state of a muscle can vary depending on the amount of use it receives, the stress placed on it, or abnormalities in muscle function. If a muscle is stimulated continuously for an extended amount of time the muscle will slowly weaken until it no longer responds. This is called **muscular fatigue**. If a muscle maintains a partial contraction, it has **muscle tone**. This tone helps to maintain true posture. Muscle tone can have abnormalities. **Hypotonic** muscles have a decrease in muscle tone or tension, while **hypertonic** is an increase in muscle tone or tension. The size of a muscle can also be affected based on over or under use. The weakening or wasting away of muscles that result in a decrease in size is called **muscle atrophy**. This often occurs when a muscle is underused or immobilized after an injury. **Muscle hypertrophy** is the increase of the diameter of the muscle fiber.

Muscle movement is dependent on the body's ability to turn on certain muscles while it turns off others. The muscle that is mainly responsible for producing a particular muscle movement is called the **agonist**, or prime mover. The muscle that opposes the agonist or is in the opposite muscle group is called the **antagonist**. A muscle that works with the agonist and assists in stabilizing the joint through movement is called a **synergistic** muscle. The Law of Reciprocal Inhibition requires that when an agonist muscle contracts, the antagonist muscle must relax.