

Chapter 8

Muscular Fitness

Chapter Objectives:

1. What is the difference between muscular strength and muscular endurance?
2. How does weight-training program affect males and females differently?
3. What three types of fibers are found in skeletal muscles?
4. How can training principles be applied to improve muscles strength and muscular endurance?
5. What are the primary differences between muscular strength and muscular endurance training?
6. What safety practices should you follow when lifting weights?

Muscular Fitness includes two health related components of physical fitness:

- A. Muscular strength – is the ability of a muscle group to apply a maximal force against a resistance one time.
- B. Muscular endurance – is the ability to repeat muscle movement over a period of time.

Myths about Weight Training:

- A. Muscle-bound Physique-
- B. Is Weight Training Good for Females-
- C. Can Muscle turn into Fat?-

Muscle Fiber Composition:

- Skeletal muscles are attached to bones by tendons. When they contract or shorten, they produce movement. There are three types of skeletal muscle fibers, slow, intermediate, and fast twitch. All three types of fibers are found in skeletal muscles. Heredity determines the number of slow, intermediate, and fast-twitch fibers you possess. However, you can improve both the fitness and performance level of each kind of fiber with appropriate exercise.
- A. **Slow-Twitch Fibers** – Also called red fibers because of the large amount of blood supply directed to them. Such fibers are slow to contract but have the ability to continue contracting for long periods of time. Best suited for aerobic or muscular endurance activities, since they don't tire easily.

- B. **Intermediate-Twitch Fibers** – possess a combination of fast and slow twitch fiber characteristics. Specifically, intermediate-twitch fibers are capable of contracting at a faster speed than slow-twitch fibers but slower speed than fast-twitch fibers.
- C. **Fast-Twitch Fibers** - Also called white fibers. These fibers contract quickly, allowing explosive muscular contractions and, therefore, lend themselves more readily to anaerobic, or strength related activities.

Methods of Developing Muscular Fitness - As in strengthening the heart, a skeletal muscle becomes stronger when it works harder than it has been accustomed to working. Three types of exercises provide resistance to make the muscle work harder for the purpose of developing muscular fitness: Isometric, Isotonic, isokinetic.

- A. **Isometric** – in an isometric exercise, you contract, tighten, your muscles but do not change their length. To perform an isometric exercise you push against a stationary object or against another part of your body that prevents movement.
- B. **Isotonic** – are those in which you lengthen and shorten the muscle through a full range of movement while lowering and raising a resistance. The resistance may be in the form of a barbell or your own body weight
- C. **Isokinetic** – The isokinetic machine mechanically allows you to overload a muscle with maximum resistance throughout the muscle's entire range of movement at a constant speed.

Principle of Overload – To improve muscular fitness, you must deal with three factors.

1. First you must stimulate the muscle. This is accomplished by placing an overload on the muscle, making it work harder than normal.
 2. Second factor is nutrition. In order for a muscle to grow, it must receive adequate nutrients, which will be discussed in later chapters.
 3. Time to rest is the next factor.
- A. **Frequency** – Once your muscles have been stimulated by some form of resistance, such as lifting weights, they must be given time to grow. You must spend sufficient time resting between training sessions to allow this growth to occur. Most authorities agree that at least 48 hours are required.
 - B. **Intensity** – The intensity of a weight training program is called **resistance** and is determined by the amount of weight you lift. While you must increase resistance to improve muscular strength and endurance, it is important to remember the increase must be gradual.
 - C. **Time** – This refers primarily to the number of times the exercise is performed. A **repetition** is the completion of a single, full-range movement of the body part being exercised. Each time you lift barbell or do a callisthenic exercise, you are performing one repetition. A group of repetitions performed one after another is called a **set**.

Muscular Endurance – To develop muscular endurance, the resistance (intensity) should be low and the number of repetitions (time) high. Three sets of 12 to 20 repetitions need to be performed.

Muscular Strength – Whereas muscular endurance is developed with the use of light weights and many repetitions, muscular strength is developed with the use of heavy weights and few repetitions. Three sets of 4 – 8 repetitions need to be performed.

Summary of Muscular Fitness Training Guidelines

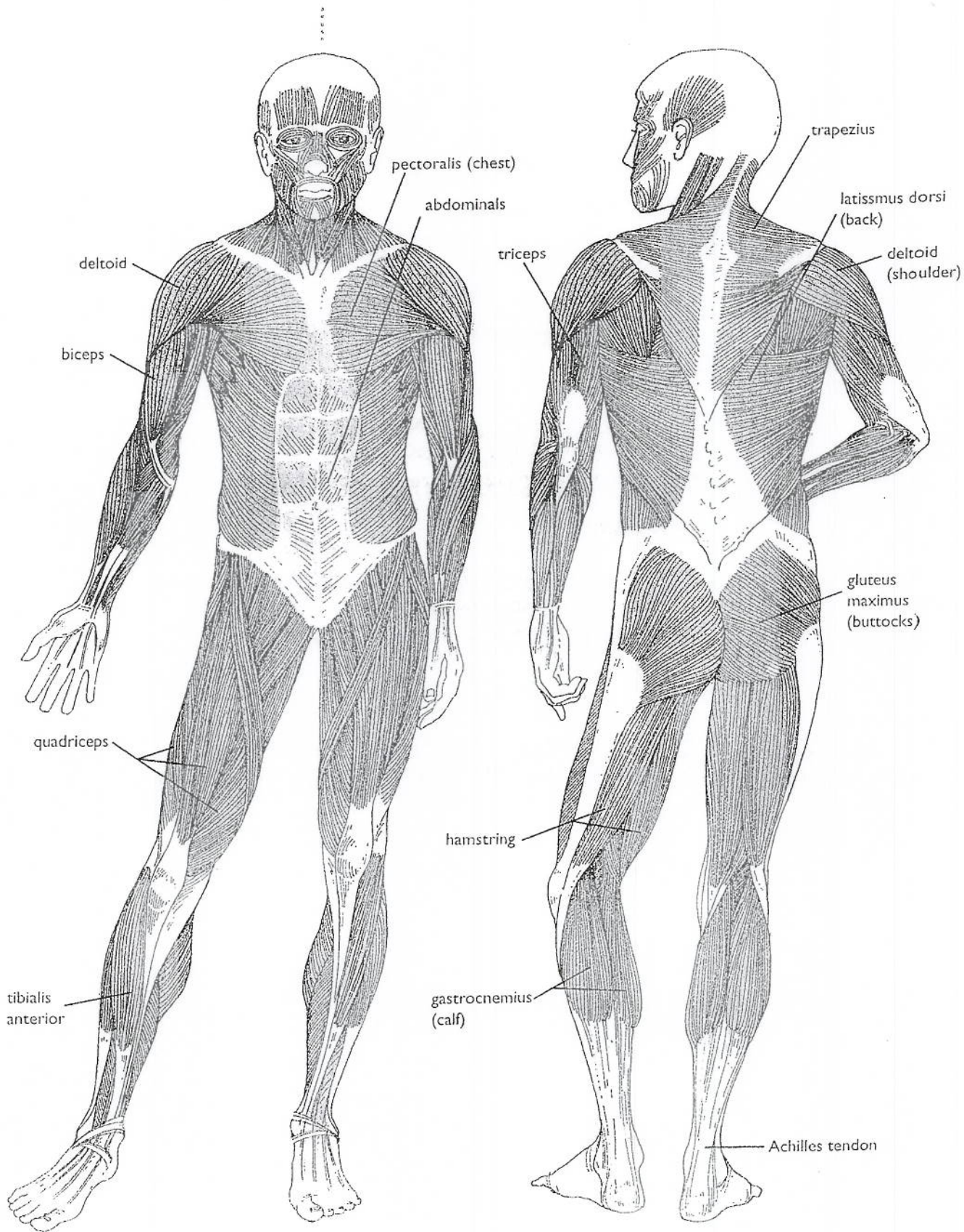
Muscular Endurance

- Frequency – Every other day for each muscle group
- Intensity – Low resistance (30 to 50% 1RM)
- Time – High repetition (12 to 20 reps, 1 to 3 sets)

Muscular Strength

- Frequency – Every other day for each muscle group
- Intensity – Heavy weights (60 90% 1RM)
- Time – Low repetitions (4 to 8 reps, 1 to 3 sets)

Principle of Specificity: You must overload the specific muscle you want to improve. If you want to increase leg strength, you must do leg exercises. You will not improve your leg strength by doing arm exercises.



Major muscles of the human body. (Source: From *Middle School Life Science*, 1st edition by Judy Capra, p. 187. Copyright © 1991 by Jefferson County Public Schools, Golden, Colorado. Printed with permission.)

