11.3: Fitness and Health

Learning Objectives

- Define fitness and explain the essential elements of physical fitness.
- List the physical, mental, and emotional benefits of physical activity.

Becoming physically fit is an important part of achieving optimal health. A well-rounded exercise program is crucial to become and remain healthy. Physical activity improves your health in a number of ways. It promotes weight loss, strengthens muscles and bones, keeps the heart and lungs strong, and helps to protect against chronic disease. There are four essential elements of physical fitness: cardiorespiratory endurance, muscle strength, muscle endurance, and flexibility. Some enthusiasts might argue the relative importance of each, but optimal health requires some degree of balance between all four. Neither a muscle-bound weight lifter unable to bend down to tie his shoes nor a flexible yoga enthusiast who cannot lift her suitcase can be considered completely fit. All four elements of physical fitness are vital.
The Essential Elements of Physical Fitness

Building cardiorespiratory endurance through aerobic exercise is an excellent way to maintain a healthy weight. Working on this element of physical fitness also improves your circulatory system. It boosts your ability to supply the body’s cells with oxygen and nutrients, and to remove carbon dioxide and metabolic waste. In addition, aerobic exercise makes you breathe faster and more deeply, which maximizes oxygen levels in the blood. Regular, moderate aerobic activity, about thirty minutes at a time for five days per week, trains the body to deliver oxygen more efficiently, which strengthens the heart and lungs, and reduces the risk of cardiovascular disease. Mayo Clinic. “Fitness Training: Elements of a Well-Rounded Routine.” September 3, 2011. www.mayoclinic.com/health/fitness/elements-of-a-well-rounded-routine.

The most common standard for evaluating cardiorespiratory endurance is the VO$_2$ max test. VO$_2$ max is your maximal oxygen uptake, and the VO$_2$ max test measures the amount of oxygen (in relation to body weight) that you can use per minute. A test subject usually walks or runs on a treadmill with an air mask over their face to measure oxygen consumption as exercise intensity increases (Video 15.2). At some point, the amount of oxygen consumed no longer increases despite an increase in exercise intensity. This value of oxygen consumption is referred to as VO$_2$ max, ‘V’ meaning volume, and ‘max’ meaning the maximum amount of oxygen (O$_2$) consumed independent of exercise intensity.

The higher the number, the more oxygen you can consume, and the faster or longer you can walk, run, bike, or swim, among other aerobic activities. Ed Eyestone, “How to Improve Your VO$_2$ Max,” Runner’s World, 9 January 2008. http://www.runnersworld.com/article/0,7120,s6-238-244--12408-0,00.html.
Muscle strength and muscle endurance are two other essential elements of physical activity. They are not just crucial for athletes and bodybuilders—building muscle strength and endurance is important for children, seniors, and everyone in between. The support that your muscles provide allows you to work, play, and live more efficiently. Strength training involves the use of resistance machines, resistance bands, free weights, or other tools. However, you do not need to pay for a gym membership or expensive equipment to strengthen your muscles. Homemade weights, such as plastic bottles filled with sand, can work just as well. You can also use your own body weight and do push-ups, leg squats, abdominal crunches, and other exercises to build your muscles. If strength training is performed at least twice a week, it can help to improve muscle strength and endurance, and to increase bone strength. Strength training can also help you to maintain muscle mass during a weight-loss program.

Flexibility is the range of motion available to your joints. Yoga, tai chi, Pilates, and stretching exercises work to improve this element of fitness. Stretching not only improves your range of motion, it also promotes better posture, and helps you perform activities that can require greater flexibility, such as chores around the house. In addition to working on flexibility, older adults should include balance exercises in their regular routine. Balance tends to deteriorate with age, which can result in falls and fractures.

Some forms of exercise confer multiple benefits, which can help you to balance the different elements of physical fitness. For example, riding a bicycle for thirty minutes or more not only builds cardiorespiratory endurance, it also improves muscle strength and muscle endurance. Some forms of yoga can also build muscle strength and endurance.
along with flexibility. However, addressing fitness standards in all four categories generally requires incorporating a range of activities into your regular routine.

**Metabolic Fitness**

Being fit also encompasses metabolic fitness. It relates to the number of calories you require to survive and the number of calories you burn during physical activity. Recall that **metabolism** is the sum of all chemical reactions that occur in the human body to conduct life’s processes. Some are catabolic reactions that break down nutrients to supply the body with cellular energy. The rate at which a person burns calories depends on body shape, body composition, sex, age, nutritional status, and genetics.

One measurement of metabolic fitness is **resting metabolic rate**, or RMR, which is a measurement of the amount of energy required for the body to maintain its basic functions while at rest, i.e. breathing, heart beats, liver and kidney function, and so on. On average, RMR accounts for between 50 and 70 percent of a person’s total daily energy expenditure. Different factors can affect the RMR, and as a result it is not a perfect measurement for metabolic fitness. For example, a slender person who is tall has more body surface area and therefore has a higher RMR. Also, muscle utilizes more energy at rest than fat, and a person with more muscle mass has a higher RMR.

A second measurement of metabolic fitness is the number of calories burned during physical activity. The amount of calories burned depends on the rate at which the heart beats, how much oxygen is delivered to tissues, and how efficiently metabolic reactions consume oxygen and burn calories. One of the best estimates of energy expenditure during exercise is how much oxygen a person consumes. Recall that VO\(_2\) max is used to measure cardiorespiratory endurance. Greater VO\(_2\) max is indicative of better oxygen metabolism and cardiovascular fitness, meaning more calories burned. In contrast to RMR, VO\(_2\) max increases significantly with exercise training, from increasing blood flow to tissues to increasing the strength of heart muscle contraction. Greater blood flow into the tissues means more oxygen to muscle, which means more calories burned.

Increasing your daily activity and shedding excess weight helps to improve metabolic fitness. However, you do not have to be the perfect weight to be metabolically fit. Metabolic fitness is highly individualized. Also, any improvement to metabolic fitness is beneficial and means a decrease in the risk for developing diabetes, or other chronic conditions.

**Keeping Fit: The Benefits of Physical Activity**

Regular physical activity is one of the best things you can do to achieve optimal health. Individuals who are physically active for about seven hours per week lower the risk of dying early by 40 percent compared to those who are active for less than thirty minutes per week. Centers for Disease Control and Prevention. "Physical Activity and Health: The Benefits of Physical Activity." Last updated February 16, 2011. http://www.cdc.gov/physicalactivity/everyone/health/index.html. Improving your overall fitness involves sticking with an exercise program on a regular basis. If you are nervous or unsure about becoming more active, the good news is that moderate-intensity activity, such as brisk walking, is safe for most people. Also, the health advantages of becoming active far outweigh the risks. Physical activity not only helps to maintain your weight, it also provides a wealth of benefits—physical, mental, and emotional.
Physical Benefits

Getting the recommended amount of physical activity each week, about 150 minutes of moderate, aerobic exercise, such as power walking or bicycling, does not require joining a gym, wearing spandex, or taking expensive, complicated classes. If you can’t commit to a formal workout four to five days per week, you can become more active in simple ways—by taking the stairs instead of the elevator, by walking more instead of driving, by going out dancing with your friends, or by doing your household chores at a faster pace. It is not necessary to perform at the level of a professional dancer or athlete, or to work out for several hours every day, to see real gains from exercise. Even slightly increased activity can lead to physical benefits, such as:

- **Longer life.** A regular exercise program can reduce your risk of dying early from heart disease, certain cancers, and other leading causes of death.
- **Healthier weight.** Exercise, along with a healthy, balanced eating plan, can help you lose extra weight, maintain weight loss, or prevent excessive weight gain.
- **Cardiovascular disease prevention.** Being active boosts HDL cholesterol and decreases unhealthy triglycerides, which reduces the risk of cardiovascular diseases.
- **Management of chronic conditions.** A regular routine can help to prevent or manage a wide range of conditions and concerns, such as metabolic syndrome, Type 2 diabetes, depression, arthritis, and certain types of cancer.
- **Energy boosts.** Regular physical activity can improve muscle tone and strength and provide a boost to your cardiovascular system. When the heart and lungs work more efficiently, you have more energy.
- **Strong bones.** Research shows that aerobic activity and strength training can slow the loss of bone density that typically accompanies aging.

Mental and Emotional Benefits

The benefits of an exercise program are not just physical, they are mental and emotional as well. Anyone who has gone for a walk to clear their head knows the mental benefits of exercise firsthand. Also, you do not have to be a marathoner on a “runner’s high” to enjoy the emotional benefits of becoming active. The mental and emotional benefits of physical activity include:

- **Mood improvement.** Aerobic activity, strength-training, and more contemplative activities such as yoga, all help break cycles of worry, absorption, and distraction, effectively draining tension from the body.
- **Reduced risk of depression, or limited symptoms of it.** Some people have called exercise “nature’s antidepressant,” and studies have shown that physical activity reduces the risk of and helps people cope with the symptoms of depression.
- **Cognitive skills retention.** Regular physical activity can help people maintain thinking, learning, and judgement as they age.
- **Better sleep.** A good night’s sleep is essential for clear thinking, and regular exercise promotes healthy, sound sleep. It can also help you fall asleep faster and deepen your rest.

Changing to a More Active Lifestyle

A physically active lifestyle yields so many health benefits that it is recommended for everyone. Change is not always
easy, but even small changes such as taking the stairs instead of the elevator, or parking farther away from a store to add a bit more walking into your day can lead to a more active lifestyle and set you on the road to optimal health. When people go one step further by walking or biking on a regular basis, or becoming active by growing and maintaining a garden, they do more than promote their own health—they safeguard the health of the planet, too.

As you change to a more active lifestyle, select an activity that you can integrate into your schedule smoothly, so you can maintain it. For example, instead of making time to get coffee with friends, you might suggest a walk, roller blading, or going for a swim in the campus pool. Also, find an activity that you will be motivated to do. Some people decide to participate in team sports, such as local soccer or softball leagues, because they enjoy being active with others or like knowing that a team relies on them. Others prefer to take a class, such as spinning or yoga, that is led by an instructor who will motivate them. Still others prefer more solitary pursuits, such as taking a jog alone in their neighborhood. No matter what your preference, you are more likely to stick to a workout program if you enjoy it.

Whatever activities people choose to do, if they expend an extra 500 calories per day, they will lose 1 pound per week, become more physically fit, and maintain a healthy nutritional profile. The exact number of calories expended per hour will vary, depending on an individual’s weight and level of exertion. However, it can be helpful to keep these numbers in mind (which are for an adult who weighs about 160 pounds) when considering a program of aerobic activity:

- Walking at two miles per hour burns 204 calories per hour
- Bicycling burns 292 calories per hour
- Jogging burns 606 calories per hour
- Golf burns 314 calories per hour, if players carry their clubs
- Ballroom dance burns 219 calories per hour
- Tennis burns 584 calories per hour


---

**Key Takeaways**

Physical fitness is an important part of the pursuit of optimal health. Regular exercise yields multiple benefits in terms of preventing disease and promoting health. The four essential elements of physical fitness are cardiorespiratory endurance, muscle strength, muscle endurance, and flexibility.

---

**Discussion Starter**

1. If exercise helps people feel better, why don’t more people do it regularly? Discuss some ways to motivate more people to exercise. What are some of the ways that a regular routine could benefit someone currently leading a sedentary lifestyle?