1. Physiology and benefits of exercise, basic physiology of exercise, aerobic exercise, benefits of exercise, what is exercise, anaerobic exercise, components of physical fitness, role of exercise in disease prevention

Heading 1 **What is exercise?**

1. Exercise is an activity that results in contraction of skeletal muscle. The term is usually used in reference to any activity that improves physical fitness. Although[i] muscle contraction is the common element of all forms of exercise, many other organs and systems are affected, for example, the heart and lungs.

Heading 2 **Basic Physiology of Exercise**

2. Contraction of skeletal muscles, the muscles under conscious[ii] control, is the primary physiological event during exercise. Because skeletal muscles can actively contract, but are not designed to actively lengthen, they are arranged[iii] as opposing pairs. As one muscle shortens, another is stretch[iv]ed. An example of such a pair of muscles can be observed[v] in the upper arm, where the biceps and triceps have opposite actions.

Heading 3 **Anaerobic Exercise**

3. This type of exercise involves heavy work by a limited number of muscles, for example during weight lifting[vi]. These types of activities are maintained only for short intervals, and the supply of oxygen is insufficient for aerobic metabolism, resulting in a substantial oxygen debt. This exercise increases strength and muscle mass, but is of limited benefit to cardiovascular health.

Heading 4 **Aerobic Exercise**

4. This type of exercise uses oxygen to keep large muscle groups moving continuously at an intensity that can be maintained for at least 20 minutes. This form of exercise uses several major muscle groups throughout the body, resulting in greater demands[vii] on the cardiovascular and respiratory systems to supply[viii] oxygen to the working muscles.

Heading 5 **Benefits of Exercise**

5. Regular exercise reduces the risk of death due to heart disease and stroke[ix], aids in reducing weight, strengthens bones, and enhances immune function. The psychological benefits are also broad. One area of controversy has been how much exercise is enough to improve general health, reduce the risk of heart disease, and increase longevity[x]. Meaningful studies on this topic are very difficult to perform because they require large populations of subjects and many years of data collection, and because poor health sometimes negatively influences physical activity. Despite these difficulties, it is clear that regular exercise, along with a generally healthy lifestyle, is beneficial[xi].

Role of Exercise in Disease Prevention

Studies have shown that exercise can have a direct effect on preventing heart disease , cancer , and other causes of premature death. Furthermore, participation in regular physical activity may reduce the rate of occurrence of these maladies. An inverse relationship exists between disease and exercise, meaning that with increased levels of physical activity there is a decreased prevalence for certain diseases. Currently, there is strong evidence that exercise has powerful effects on mortality, CAD (including blood lipid profiles), and colon cancer. Research has also confirmed that aerobic exercise can reduce high blood pressure , obesity, type II diabetes, and osteoporosis . In addition,

stroke and several types of cancer (such as breast, prostate , and lung cancer) can also be reduced with regular physical activity.

Even more important, several of these factors are interrelated. For example, when an individual lowers his or her high blood pressure, the risk for heart disease, stroke, and kidney disease is also reduced. Another example is that exercise favorably alters blood lipid profiles. These profiles include measurements of total cholesterol (TC, complete count of all cholesterol in the blood), high-density lipoprotein cholesterol (HDL-C, the "good" cholesterol), low-density lipoprotein cholesterol (LDL-C, the "bad" cholesterol), and triglycerides (TRG, storage form of energy), which reduce the risk of plaque buildup in the coronary arteries, a sign of CAD.

Exercise Prescription

Adequate physical activity is dependent on having a well-rounded program that encompasses all aspects of improving health and preventing disease. A well-rounded program includes cardiovascular fitness, muscular strength and endurance, flexibility, posture, and maintenance of body composition.

Components of Physical Fitness

Cardiovascular Fitness

The ability of the body to perform prolonged, large-muscle, dynamic exercise at moderate to high levels of intensity. This is dependent on the ability of the heart and lungs to deliver oxygen to the working muscles. As fitness levels improve, the body functions more efficiently and the heart can better withstand the strains of everyday stress.

Muscular Strength

The maximal amount of force a muscle can exert with a single maximal effort. Strong muscles are important for carrying out everyday tasks, such as carrying groceries, doing yard work, and climbing stairs. Muscular strength can help to keep the body in proper alignment, prevent back and leg pain, and provide support for good posture.

Muscular Endurance

The ability of a muscle or group of muscles to perform repetitive contractions over a period of time. Endurance is a key for everyday life activities and operates with muscular endurance to help maintain good posture and prevent back and leg pain. In addition, endurance can enhance performance during sporting events, as well as help an individual cope with everyday stress.

Flexibility

This refers to the range of motion in a joint or group of joints, correlated with muscle length. This component becomes more important as people age and their joints stiffen up, preventing them from doing everyday tasks. Additionally, good range of motion will allow the body to assume more nautral positions to help maintain good posture. Stretching is therefore an important habit to start, as well as continue, as one ages.

Body Composition

The relative proportion of fat-free mass to fat mass in the body. Fat-free mass is composed of

muscle, bone, organs, and water, whereas fat is the underlying adipose tissue. Excessive fat is a good predictor of health problems because it is associated with cardiovascular disease, high cholesterol, and high blood pressure. Higher proportions of fat-free mass indicate an increase in muscle, and thus an increased ability to adapt to everyday stress.

The most effective way to participate in a well-rounded program is by following a simple mnemonic device called FITT (Frequency, Intensity, Time, Type). The FITT principle includes how many times a week one should exercise (frequency), how intense the workout should be (intensity), how long the workout is (time), and what modality to use (type of exercise). Modality is dependent primarily on what an individual prefers. This exercise prescription in based on an individual's fitness level when entering the exercise program, and ultimately upon the goals of the individual. For example, an untrained individual who wants to lose weight and likes to walk would be placed on a program of treadmill or outdoor walking (type), for thirty minutes a day (time), three to five times per week (frequency), and of light to moderate intensity (intensity).

A good example of an exercise program would include three stages. The first stage is a warm-up, where one should complete light calisthenics to activate and warm the muscles, immediately followed by stretching, which helps to maintain flexibility. The second stage is the conditioning stage, which consists of cardiovascular work to enhance the function of the heart and lungs and a resistance-training regimen to strengthen and tone major muscle groups, such as the quadriceps, hamstrings, chest, biceps, triceps, back, and abdominals. The final stage consists of a cool down, or reduction in heart rate to resting levels, as well as stretching again, since the greatest modification in flexibility comes from post-exercise stretching.

Maintenance of physical activity is important to maintain a healthy lifestyle. In addition, it is important to follow an exercise regime that will start slow and gradually increase as fitness level and exercise tolerance increases. The key is to complete at least thirty minutes of activity most days of the week in the form of activities that one enjoys, such as walking, jogging, swimming, aerobic dance, biking, skateboarding, or participating in a sport. This will enable an individual to reach the goals of Healthy People 2010, which include improving the quality of life through fitness with the adoption and maintenance of regular exercise and physical activity programs.

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[i] although – ačkoli, i když,
[ii] conscious - vědomý
[iii] arranged - uspořádaný
[iv] enhance – zvýšit, zvětšit
[v] observe - pozorovat
[vi] weight lifting - vzpírání
[vii] demand - požadavek
[viii] supply - dodávat
[ix] stroke - mozková mrtvice/ příhoda
[x] longevity - dlouhověkost
[xi] beneficial - blahodárný, prospěšný

Source: http://www.faqs.org/nutrition/Erg-Foo/Exercise.html,
encarta.msn.com/text_761573631___0/Exercise.html