Warming up and the Effect of Exercise on the Muscular System

AMIT P. CHAUDHARI
Research Scholar, (Physical Education)
H.N.G. University, Patan
Gujarat (India)

Abstract:
Exercise will make the muscle more effective and more efficient. However different types of exercise will have different effects upon the muscles exercised. The effects likely to be encountered when exercising on the muscular system are increased strength and the reduced likelihood of getting an injury. It can also make one have a more flexible back, stronger heart muscle and to improve muscles control.

Keywords: *Effect, Exercises, Muscular system, Warming up*

1. Introduction

Warming up is a short time activity carried out prior to any severe or skilled activity. It is important to warm up before exercising which is usually done by including ten minutes of light activities, such as slow jog, calisthenics and stretching. Through such a workout, we try to bring the group of muscles expected to take part in the activity to follow, in a state of readiness to respond efficiently. It makes the body more flexible and thus we can avoid injuries resulting from sudden strain etc. When we stretch our muscles slowly, it results in increased blood flow and prevents injuries to the muscles, tendons, ligaments. Warm up exercises are not supposed to be done vigorously. Any light exercise such as spot jogging, cycling at slow pace, walking can be done. Warming up also prevents fatigue, muscle pulls and soreness. This preparation before a competition or training is called warming up.

2. Physiological Basis of Warming Up

When we observe the contraction and relaxation of an isolated muscle, we note that when the muscle is warmed, the speed with which the muscle contracts and relaxes and the force of contraction are increased. We can see that when a muscle is stimulated repeatedly, then the first few contraction are small and the feeling of relaxation is not satisfying. Whereas, when the contractions become stronger the feeling of relaxation is also complete. These points to the fact that warming up does produce physiological changes in the working of a muscle and that warming up helps in building a strong and efficient formation for the working of muscles.
The Physiological bases of Warming Up are as follows:

2.1 Increases the Body Temperature

A proper warming up increases the body and muscle temperature locally which helps in the efficiency of contractions and relaxation of muscles. So it has a lot of benefits for the sportspersons. Researches point that if the muscles have been slightly warmed up just before the beginning of activity the performance is greatly improved. If one fails to do warm up exercises before vigorous activity it may lead to tearing of muscle fibres.

2.2 Decreases the Viscosity of Muscles

Warming up decreases the viscosity of muscles. It is find out that if a previously inactive muscle is stimulated repeatedly, the first few contractions are often small and irregular and relaxation is incomplete. But once the contractions become stronger relaxation is complete. It takes place due to decrease in the viscosity of muscles. This leads to faster and efficient rate of muscular contraction and relaxation. It also reduces the occurrence of injury or wear and tear of muscles and ligaments.

2.3 Increases the Speed of Nerve Impulses

Warming up increases the speed of nerve impulses, which improves and sharpens the reaction time of sportspersons? Improvement in reaction time is most vital to sports persons in most of the game and sports.

2.4 Decreases the Resistance in Muscle Capillaries

A lot of research papers reveal that warming up decreases the resistance in muscle capillaries. Warming up also brings the muscles in a state of readiness. It responds to stimuli efficiently.

2.5 Increases the Speed of Oxygen and Fuel Transfer to Tissues

A proper warming up schedule increases the speed of oxygen and fuel transfer to tissues. Its occurrence takes place due to the enhancement of blood flow through the muscles by dilating the small blood vessels. Increase in oxygen supply improves the functionality of muscles.

2.6 Increases Metabolic Rate

Warming up increases the metabolic rate which ultimately improves energy level. In fact, the metabolic rate increases due to rise in core temperature. If there is an increase in temperature by 0.5°C, the metabolic rate increases by 7%. A high metabolic rate points to higher production of energy.

2.7 Reduces the Blood Lactic Acid

Researches conducted in this field indicate that heart rate and consumption of oxygen are directly related to muscle temperature. If the temperature is high the consumption of oxygen and heart rate will also be higher and will reduce blood lactic acid.

2.8 Increases in Working Capacity

The above mentioned physiological adaptations increase the capacity of a person to do physical work. All the systems of body become efficient to do their related work.

3. Methods of Warming Up

There are various methods of warming up for games and athletics, out of which the following ones are the most commonly used: 1. By exercise 2. By massage 3. By taking hot water bath 4. By sipping some hot beverages.

3.1 By Exercise

Most sets of warm up exercises include four to five very simple movements. The body should be sweating lightly when the set is done. It is the simplest and most effective method of warming up. The following exercises are included in this method.

3.2 By Massage

Massaging of muscles is a good method to gain muscle tone and is an effective means of warming up. A lot of teams today appoint their own massagers who travel with them wherever the team goes. It also helps in reducing the effect of minor injuries to muscles.

3.3 By Taking Hot Water Bath

This technique is very helpful in warming up and relaxation of muscles after competition. A hot bath is helpful in raising body temperature which results in the activation of muscles by increasing blood circulation in them. This is more common in colder climate regions as it is very efficient and quickly increases the efficiency of muscles.

4. Muscular System and the Effect of Exercise on the Muscular System

Over 600 skeletal muscles function for body movement through contraction and relaxation of voluntary, striated muscle fibers. These muscles are attached to bones, and are typically under conscious control for locomotion, facial expressions, posture, and other body movements. Muscles account for approximately 40 percent of body weight.

4.1 Supply of Oxygen

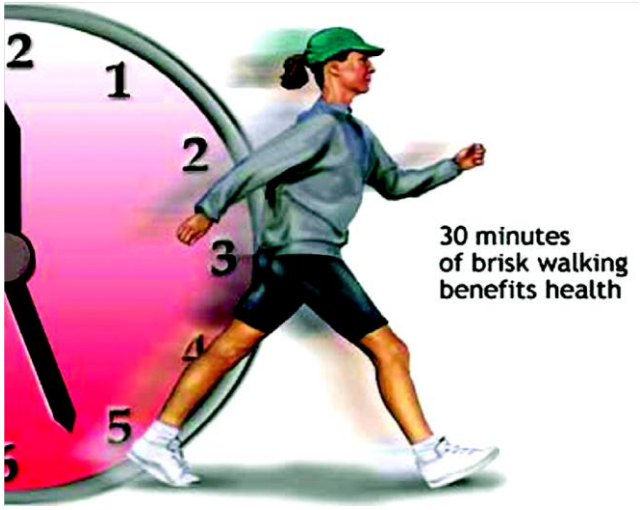

Fig. 1 30 Minutes daily walking

Skeletal muscles have two types of muscle fibers: fast-twitch and slow-twitch. Anaerobic exercise uses fast-twitch fibers. Such exercise includes activities that are fleeting and require brief high energy expenditure. Weightlifting, sprinting, and push ups are examples of anaerobic exercise. Because all cells require oxygen to produce energy, anaerobic exercise depletes oxygen reserves in the muscle cells quickly. The result is an oxygen debt. To repay the debt, humans breathe deeply and rapidly, which restores the oxygen level. Anaerobic exercise creates excess lactic acid (a waste product). By increasing oxygen intake, the liver cells can convert the excess lactic acid into glucose, the primary food molecule used in cellular metabolism. Aerobic exercise uses slow-twitch muscle fibers. Such exercise includes activities that are prolonged and require constant energy. Long distance running and cycling are examples of aerobic exercise. In aerobic exercise, the muscle cell requires the same amount of oxygen that the body supplies. The oxygen debt is Aerobic exercise uses slow-twitch muscle fibers. Such exercise includes activities that are prolonged and require constant energy. Long distance running and cycling are examples of aerobic exercise. In aerobic exercise, the muscle cell requires the same amount of oxygen that the body supplies. The oxygen debt is slashed and lactic acid is not formed. Slashed and lactic acid is not formed.

4.2 Effect of Steady Exercise

Steady exercise is when sufficient oxygen can be breathed in to satisfy the needs of the muscles. Oxygen is required by the muscles to clear away waste products [lactic acid] which are formed during the contraction of muscle. During steady exercise the muscles use mostly fat for the creation of energy, but also glucose. As long as the glucose supplies last, the body can continue the exercise quite comfortably. However, when the glucose is all used then the body has to continue on fats alone. The effect of this is a build up of acid in the blood stream, and heavy sweating resulting in dehydration. The body cannot continue due to a rising of temperature and the person has to stop. If he attempted to continue he would eventually collapse.

4.3 Effect of Intense Exercise

When the level of exercise reaches the stage where the amount of oxygen breathed in is insufficient to clear away the waste products formed by the muscle contractions, then an oxygen debt builds up. The waste products (mainly lactic acid) continue to build up causing pain in the muscles and breathlessness. Soon, the performer has to stop or at least slow down. The rate of breathing will stay very high until the oxygen debt has been paid off, i.e. the waste products have been cleared away.

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