

Physiological Effects of Exercise

Dr. Kalidas Tadlapurkar: M.S.M College of Physical Education Aurangabad

Dr. Bipin Suryavansi: Devgiri College Aurangabad

Abstract

Exercise physiology present the material essential for understanding relevant changes in various mechanism of body physiological change describe the immediate and Long term effect of modern exercise and specific training on the function of muscle, organs, systems of the body and the relationship of activity and fitness to health. Physiological changes due to modern exercise and specific training is three stages are as Biochemical changes, Systematic changes and other changes.

In Biochemical changes; The regular physical exercise as in sportsmen is reflected in a slight elevated basal metabolic rate Bio mechanical changes increase in the size and number of mitochondria, myoglobin and hemoglobin content and thereby increased oxidative capacity. The increased oxidative capacity of the trained muscle has greater ability to use non-carbohydrates for energy. Increased metabolic rate causes burning of fat and content of muscle protein increases.

Systematic changes increase in the size of fibers and connective tissue. Modern exercise during and after competition and training also influences the rate of breathing. Vital capacity, breathing capacity and total lung capacity increases due to exercise. The amount of air ventilated at the maximum efforts, increasing with training the heart size increase due to the aerobic training and the strength training causes increase in the thickness of ventricle walls thereby increasing the efficiency of heart, cardiac output and stork volume. Blood pressure increases during exercise, as the requirement of blood by muscle is increase. The pressure exerted on the walls of the blood vessels increases as the heart pumps more and more blood to meet the requirement of muscle. New capillaries are formed within the muscle fibers. The additional capillaries increase the supply of oxygen to tissues.

In other changes includes Decreased body fat, decreased blood levels of cholesterol and trygleyrides. Increased heat acclimatization and increased breaking strength of bone, Ligaments and Tendon.

The prevalent aim of this theoretical as well as scientific based paper is to highliting the information about physiological changes due to modern exercise and specific training.

Physiological changes due to modern exercise and specific training is an aspect of exercise physiology as well as sports medicine. It studies the functional changes that occur in the human

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body when exposed to physical activity. Physiological changes due to modern exercise and specific training in three stages are as under Biochemical, systematic and other changes.

In Biochemical changes:

The regular physical exercise as in athletes is reflected in a slightly elevated basal metabolic rate. Training of muscles causes increase in the size and number of mitochondria, myoglobin and hemoglobin content and thereby increases oxidative capacity. The increased oxidative capacity of the trained muscle has greater ability to use non-carbohydrates of energy. Increased metabolic rate causes burning of fat and content of muscle protein increases.

Brief periods of exercise as in sprinting swimming activity etc causes transitory accumulation of lactic acid in muscle, which result in fatigue. A trained and practicing sportsman can tolerate 200 mg of fatigue acid per 100 ml of blood. Thus recovery after a strenuous activity is fast. We know very well ATP is immediate source of energy and break down of ATP release energy for muscular contraction and can be used by the muscle cell to perform its work. But there is limiting quantity of ATP in a muscle cell and the ATP can give 5.7 to 6.9 kilo calories of energy only. Regeneration of ATP is required for energy. Regular aerobic training may improve muscular effect of ATP and PC.

Specific training and modern exercise also increased the oxidation of fat and carbohydrates. Fat in the form of triglycerides are broken down into 2 carbon compound (A) group of by a series of reactions called beta oxidation (B) before entering into creb cycle.

In systematic changes are as under:

(i) Endocrine changes:

Under this heading the endocrine glands improve in its size and level of hormonal secretions. Which primarily maintain the chemical balances of the body; these changes are attributed to good health through exercises. Due to specific training the higher levels of secretions of androgens takes place and improve the athletic performance by increasing maximal muscular strength.

(ii) Muscular changes:

It wells known fact that excellent sports performance directly depend on muscle potential and function, which is turn to wholly dependent on whole body system.

Though the number and types of fiber is genetically determined, the aerobic training may change their proportion by increasing inter medially type of red muscle fiber. If the slow twitch fiber type are experientially stimulated at the steady low frequency over extended period as in long distance running, the fiber becomes predominately slow twitch type. On the countering, as might be expected quick bursts of muscle activity promote development of fast twitch type.

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Many fibers are not able to contract and they are known as dormant/inactive fibers. Modern exercise improves transmission of nerve impulses and thereby causes dormant fiber to become active. The individual muscle fibers increase in thickness as a result of strength training.

Growth of total muscle is due to mainly to the increase in fiber size as muscle fibers are not created through exercise but they are enlarged. Modern exercise improved cardiovascular functioning causes the more and more blood being supplied with specific training and the muscle fiber becomes more active and efficient.

Respiratory changes:

As a result of modern exercise, the demand for oxygen increases. In response to this demand for more oxygen, the rate and depth of breathing are immediately increased. Emotional and environmental factors before exercise and competition also influence the rate of breathing. Vital capacity, breathing capacity and total lung capacity also increases.

The trained athlete significantly lower values of breathing equivalent, which is the amount of air, ventilated through the lungs for one liter of oxygen consumption. The efficiency is increased mainly because of the trained respiratory musculature.

The amount of air ventilated at the maximum efforts, increase with training. Normally, the maximum minute ventilation is about 70-100 liters per minute. In case of a trained athlete minute ventilation increases to 120 liters per minute in highly trained endurance athletes, the volumes have been found even upto 180 liters/minute.

Increase in pulmonary ventilation with training is caused partially by increase in the maximal oxygen uptake, which leads to an increased production of carbon dioxide and due to a higher level of lactate. Tidal volume with modern exercise, breathing frequency is reduced with training this leads to extraction of more oxygen from the inspired air diffusion of oxygen through the alveoli membrane is increased; the mainly due to increase in the number of pulmonary capillaries and increased area of alveoli. Second wind may fail to appear in case of trained athletes.

Circulatory changes:

Circulatory system consists of heart, Blood, veins, arteries and capillaries heart is the chief organ of circulatory system. Modern exercise increased cardiac output by 40-60% of maximal capacity during rest it is around liters/min. whereas while exercising, it increases upto 40 liters/minute. In other case stroke volume increases progressively from rest to moderate work and then it levels off at about 30 to 40% of the maximum aerobic power.

As result of modern exercise, the size of the heart change. Heart size increases due to endurance training and the strength training causes increase in the thickness of ventricle walls thereby increasing the efficiency of heart.

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Blood pressure also increase during modern exercise as the requirement of blood by the muscles is increased. The pressure exerted on the walls of the blood vessels increases as the heart pumps more and more blood to meet the requirement of muscles.

Pulse becomes normal in the shorter duration after the cessation of activity in case of trained athletes.

Modern exercise resulting as new capillaries is formed within the muscle fibers. The additional capillaries increase the supply of oxygen to tissues and the latent capillary become active and start. The quantity of R.B.C.'s increases with regular training.

Cardio- Respiratory Changes:

The cardio-respiratory system is the basic life support system of the body. The improvement in the cardio respiratory system through modern exercise increased heart efficiency of Athletic.

The heart becomes capable of adapting to the increased demand through several mechanisms. Heart rate shows a gradual adaptation to an increased work load by increasing proportionally to the modern exercise and will plateau at a given level for about 2 to 3 minutes. The resting heart rate decreases with modern exercise. The rate of oxygen consumption can be estimated by taking the heart rate.

The amount of blood flowing to the various organs increases due to modern exercise. In skeletal muscles capillarisation.

Modern exercise and specific training increase the total blood volume, with a corresponding increase in the amount of hemoglobin.

As the result of specific training some changes occur in lung volumes and capacities. The volume of air that can be inspired in signal maximal ventilation is increased. Pulmonary resistance to a flow is also decreased.

Other Changes:

Modern exercise and specific training causes additional stress on connective tissue of muscles and makes then thicker and tougher as exercise multiplies tendons and ligaments modern exercise and specific training tones up muscles improve the body shape by increasing the physical, physiological and biochemical potential of muscle.

Trained muscles are less many to injury during strenous and vigorous exercises like stretching, jumping punching etc.

Other changes also resulting, decreased body fat, decreased blood levels of choleslents decreased blood during resound exercise increased heat acclimatization and increased breaking strength of bone, ligament and tendons.

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