



## REVIEW OF RESEARCH

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### IMPACT OF AEROBIC EXERCISE ON HUMAN SYSTEMS

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#### INTRODUCTION

*Aerobic exercise is any activity that uses the larger muscles of the body --- like the thigh muscles --- and is sustained for at least ten minutes at a time. It is called aerobic because activity of this type requires the body to take in a higher-than-normal amount of oxygen. The benefits of aerobic exercise (also called cardio or cardiovascular exercise) are many, but most notable are the oxygen necessary to accomplish the work is taken up by the individual during the activity.*



*benefits to the cardiovascular and respiratory systems. Aerobic exercise uses oxygen when bringing energy to the muscles. It is typically a moderately challenging workout that keeps the heart rate elevated, according to Science Daily. Oxygen sheds glucose and fats while working out to create an energy transporter called adenosine triphosphate. The term "aerobic" implies that.*

#### HISTORY

A medical doctor, Kenneth H. Cooper, coined the word in 1968 in his book, "Aerobics," about the relationship between exercise and cardiovascular health, according to Cooper40Aerobics.com. Dr. Cooper simply added an "s" to an existing adjective, "aerobic," which means "to live in air or with oxygen." But it wasn't until 1986 that Dr. Cooper submitted the official definition of "aerobics" to the Oxford English Dictionary. It reads: "Method of physical exercise for producing beneficial changes in the respiratory and circulatory systems by activities which require meeting a modest increase in oxygen intake and so can be maintained."

#### What is Aerobic Exercise?

The aerobic exercise defined as "any activity that uses large muscle groups, can be maintained continuously, and is rhythmic in nature." It is a type of exercise that overloads the heart and lungs and causes them to work harder than at rest. The important idea behind aerobic exercise today, is to get up and get moving!! There are more activities than ever to choose from, whether it is a new activity or an old one. Find something you enjoy doing that keeps your heart rate elevated for a continuous time period and get moving to a healthier life.

#### Types of Aerobic Exercise

- Aerobic Dance
- Bicycling
- Cross Country Skiing
- In-line Skating
- Fitness Walking

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- Jumping Rope
  - Running
  - Stair Climbing
  - Swimming

### **METHODS OF IMPROVING AEROBIC FITNESS**

- ❖ Continuous training
- ❖ Interval training
- ❖ Group classes
- ❖ Super-circuit training
- ❖ Cross training

### **EFFECTS OF AEROBIC TRAINING ON MUSCULAR SYSTEM**

- The size of the muscle fibers increases
- Amount of protein increases
- Capillary density per fiber increases
- Amount of connective tissue increases
- Blood supply in the muscle increases
- Increases myoglobin content
- Oxidation of carbohydrates and fats increases
- Number of mitochondria increases
- Increases the Fat free weight
- Flexibility increases

### **EFFECTS OF AEROBIC EXERCISES ON RESPIRATORY SYSTEM**

- Lung volume increases as a result of increase in vital capacity
- Breathing frequency decreases
- Maximum minute ventilation is increased after training
- Tidal volume increases
- Enhances the ventilatory efficiency
- Increases in diffusion capacity of lungs

### **EFFECTS OF AEROBIC EXERCISES ON CIRCULATORY SYSTEM**

- Internal size of left ventricle increases
- The contraction ability or strength of heart increases
- Resting heart rate decreases considerably
- Maximum heart rate either remains unchanged or decreases slightly
- The heart rate recovery period decreases
- Stroke volume increases during rest and sub or maximal exercise
- No change in cardiac output at level of exercise
- Considerable increases in Cardiac output at maximal level of exercise
- Blood volume increases as a result of increase in plasma volume and RBC count
- Blood viscosity decreases resulting good circulation and oxygen availability
- Reduction in resting blood pressure

### **PHYSIOLOGICAL MEASURES RELATED TO AEROBIC FITNESS**

- ❖ Vo<sub>2</sub>max
- ❖ Heart rate
- ❖ Blood pressure
- ❖ Stroke volume
- ❖ Cardiac output

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## VO<sub>2</sub>MAX

VO<sub>2</sub>max is the standard measurement of cardiorespiratory fitness. VO<sub>2</sub>max is the product of cardiac output and arteriovenous oxygen difference--in effect, VO<sub>2</sub>max is the body's maximal oxygen uptake. Methods to measure your true VO<sub>2</sub>max are highly invasive and costly; thus indirect measures are used to arrive at an estimated VO<sub>2</sub>max. Higher VO<sub>2</sub>max readings are associated with improved physical activity and are typically higher in males versus females.

## HEART RATE

Heart rate is one of the best known measures of aerobic fitness. Heart rate is the number of heart beats per unit of time. Typically readings of beats per minute are given. During activity as the body demands increased blood flow the heart rate increases. A general calculation that you should be aware of during activity is your maximum heart rate, which is calculated as 220 minus your age. As fitness level increases, resting heart rate decreases and the amount and intensity of activity needed to reach your max heart rate increase.

## BLOOD PRESSURE

Blood pressure is the measure of the pressure that blood exerts throughout the vascular system. It is often measured in the arteries where pressure is the greatest. Most people are aware that blood pressure is actually not one number but two. The top number, which is the higher of the two, is systolic blood pressure, and it is the pressure created when blood is ejected from the heart. The bottom and lower number is your diastolic blood pressure, and it is the pressure created as your heart relaxes. Aerobic exercise has been found to lower resting blood pressure. During activity systolic pressure rises, while diastolic readings remain relatively unaltered.

## STROKE VOLUME

Stroke volume is the amount of blood pumped by the ventricles in a single beat. Stroke volume increases as activity increases but has been found to plateau somewhere between 40 and 60 percent of VO<sub>2</sub>max for most individuals. Aerobic training has been found to increase resting stroke volume, which results in decrease of resting heart rate.

## CARDIAC OUTPUT

Cardiac output is the amount of blood pumped by the heart per unit of time. It is equal to the product of heart rate and stroke volume. Since both heart rate and stroke volume increase with increasing activity, cardiac output increases with increases in activity level. Increases in cardiac output beyond 40 to 60 percent of VO<sub>2</sub>max are caused by increases in heart rate because of the plateau of stroke volume.

## CONCLUSION

Thus we can conclude that, in aerobic work, oxygen is obtained from the air and is transferred from the lungs to the blood and then to the muscles via the circulatory system. Maximal oxygen uptake, or maximal aerobic power (VO<sub>2</sub> max) is the indicator of aerobic fitness. Aerobic fitness is dependent upon age and sex and it can be improved by training. It is highest at ages 18, 19 years in males and 15 to 20 years in females, and it decreases with age in adulthood. In general, males have higher VO<sub>2</sub> max than females.



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