

FITNESS ST. GUIDE #1 (10-12)

SCHS PHYS. ED. DEPT.

THE HEART AND HEART RATE

STRUCTURE AND FUNCTION OF THE HEART

The heart is the most vital organ of your body, the engine that, when contracting, pumps blood to the lungs and to the trunk and lower extremities. The heart is located under your chest bone, partly in the upper left quadrant, but nearly in the center of your chest.

The heart is a muscle the size of your fist. The heart of any average size adult weighs less than 1.1 pounds. If you regularly perform physical exercise that improves your stamina, in the long run, your heart – like any muscle in your body – may grow large. During maximum performance, the heart of a person with average fitness is capable of flowing more strongly than a kitchen tap running at full force.

The heart muscle consists of two pumps, both of which have two chambers separated by valves. Carbon-dioxide filled blood travels through the veins from all parts of the body to the right half of the heart muscle, called the right atrium. From the right atrium, the heart pumps the blood to a second chamber called the right ventricle, which in turn pumps the blood to the lungs. In the lungs, the blood releases its stored carbon dioxide gases and absorbs atmospheric oxygen.

Oxygen-rich blood flows from the lungs to a chamber on the left side of the heart, called the left atrium, and from there to the left ventricle, from which the heart pumps it to the aorta and finally to the body through the arteries.

The heart functions in two phases: contraction (systole) and rest (diastole). When the heart contracts and blood flows to the rest of the body it does so at a certain amount of pressure. When the heart muscle is at rest, the pressure in the vessels decreases. These two pressures, the higher pressure a contraction (systolic pressure) and the lower pressure at rest (diastolic pressure) are the two numbers found when your blood pressure is measured. We call the heart muscle's contractions heartbeats, generally measuring them in beats per minute.

FACTORS AFFECTING HEART FUNCTION

BODY POSITION

Heart rate is lowest in the supine (lying down) position and highest when standing. The more the muscles work, the more they require oxygen-rich blood, therefore, the higher the heart rate.

FITNESS

Fit persons have a lower working and resting heart rate. The resting heart rate of a fit person can be less than 40 beats per minute, whereas an untrained person in poor condition may have a resting heart rate of over 100 beats per minute.

AGE

An individual's optimum target heart rate is determined by a person's age.

GENDER

Typically, adult women have a heart rate five to seven beats per minute (bpm) higher than that of males. This is because they have proportionately smaller hearts and other muscles.

MOOD

Various situations that excite your mind, such as stage fright or an unpleasant experience, can make your heart rate rise. Prolonged periods of stress increase heart rate as well. Opposite of that, when you are relaxed, inhaling and exhaling in a peaceful manner, and thinking about something pleasant, your heart rate lowers.

TEMPERATURE

Heart rate and changes in your body's temperature are directly related: the higher the temperature, the higher your heart rate.

STIMULANTS

Smoking and caffeinated beverages such as coffee, tea, and cola drinks increase your heart rate. The effect of caffeinated products on heart rate is minor, but smoking may increase resting heart rate temporarily by more than 10 beats per minute.

DEPRESSANTS

A small amount of alcohol usually relaxes and thus lowers the heart rate. Exercising when under the influence of alcohol is not healthy as it leads to fatigue much faster than in a person not under the influence, increases heart rate, and predisposes the person to accidents.

SURGEON GENERAL'S REPORT

The importance of participating in regular physical activity and the value of good physical education programs in schools is readily addressed in the Surgeon General's *Report of Physical Activity and Health*, drafted in 1995, which states, "The Surgeon General has determined that lack of physical activity is detrimental to your health"

The following are among the report's major findings:

- People who are usually inactive can improve their health and well-being by becoming even moderately active on a regular basis.
- Physical activity need not be strenuous to achieve health benefits.
- A person can achieve greater health benefits by increasing the amount (duration, frequency, or intensity) of physical activity.

WHY MONITOR HEART RATE?

The simplest means of determining how much physical activity is enough is to listen to your own body; listen to your heart – learn how fast it is beating. Physicians have asserted that 20 minutes of "good" cardiovascular exercise a minimum of three times a week is essential to good health. "Good" cardiovascular exercise depends on keeping your heart rate in the target zone for your age.

Letting your heart rate guide your exercise intensity to obtain optimum benefits is like using the cruise control function on your car. The heart rate monitor allows you to exercise at a constant heart rate to obtain your maximum health benefits in complete safety.