



Aerobic Conditioning

Aerobic conditioning is defined as one's ability to take in, deliver and use oxygen. Improvement in aerobic conditioning occurs when your body is exposed to a prolonged increase in oxygen uptake and metabolism. One must work at a certain level of effort in order to stimulate the body. Once improvement has occurred, the work must be made progressively harder to force further improvement. Therefore, the name of the game is overload and progression.

Maximum Heart Rate and Target Heart Rates:

You can use your heart rate (measured in beats per minute) as a guide to the intensity of your effort. Each person has a specific maximum heart rate (MHR) that can be reached in a sustained maximum effort. Many factors effect MHR, such as genetics, age and to a certain extent, conditioning. MHR is difficult to measure without sophisticate equipment but it can be estimated by this simple formula:

$$\text{Maximum Heart Rate} = 220 - \text{Your Age}$$

Therefore, a twenty year old would estimate their MHR to be 200 beats per minute.

In order to stimulate an aerobic conditioning effect, research has indicated that you must keep your heart rate at approximately 70 to 85% of the MHR for ten to thirty minutes. Use the chart below to identify your suggested heart rate. As with most training, the harder you work the greater your results will be. You should strive to train at close to 85% of your MHR. If you train much higher than 85%, the increase in lactic acid may force you to stop and rest. We will use twenty minutes as our standard training time.

Physiological Adaptations:

As your body begins to adapt, you will discover that you must exercise harder and faster than before in order to keep your heart rate at the same level it was in your initial workouts. For instance, you may find that when you first began to train that your rate reached 165 BPM while running two miles in sixteen minutes. A month later, you may find that your heart rate only reached 156 BPM while running at the same pace. You will then have to run faster to keep your heart rate intensity in the same training zone as before. Another adaptation that can be measured by heart rate is how fast you recover from exercise. As your condition improves, you will find that you can recover from exercise faster. For example, you may find that two minutes after an exercise session in which your heart rate reached 170 BPM you may have recovered to 128 BPM. Several weeks later, you may find that you can recover to 120 BPM in two minutes after the same bout of conditioning.

Other aerobic system improvements include increases in heart size, blood volume, stroke volume, cardiac output, respiratory function, heat tolerance, lactic acid metabolism, capacity to use fat more efficiently as an energy source and ability to oxidize carbohydrates. In other words...getting in shape!

Cross Training:

As you may have guessed, your heart and lungs do not know if they are having to work because you are running, swimming, biking, stair climbing or even lifting weights. You can take advantage of this to incorporate variety into your cardiovascular training and minimize the potential for overuse type injuries. All you have to do is train with your heart rate in the prescribed range in a systematically progressive way and you will force improvement to occur. There are specific peripheral changes that occur with each mode of training though. Therefore, if you have to run in your sport, then the majority of your cardiovascular training should come from running. You may get into great shape using a StairMaster, Concept II Rower, stationary bike, upper body ergometer or by swimming, but the only way to develop the skill of running is by running. We can use other cardiovascular tools to minimize the stress running can place on some athlete's joint, but you must run if you are going to run effectively.

Taking Your Pulse:

If you place your fingertips on your Adam's apple and then slide them about an inch to either side, you will feel a "lub-dub". With a second hand or stopwatch, start counting beats at a particular number and then fifteen seconds later stop counting. Double that number and then double it again and you have your heart rate. If you counted thirty-six beats, then your heart rate is 144.

Aerobic Intervals and Fartlek Training:

You can increase the intensity of aerobic training by incorporating interval and Fartlek workouts into the program. Interval training refers to workouts that combine high intensity work periods with rest intervals. Fartlek training refers to a workout that you perform continuously without resting, but involves changes in speed or work rate.

When training above approximately 85% of your MHR you may have to stop and rest periodically to allow some recovery. By manipulating the work and rest period, you can use interval training to set up a systematic and progressive method of overload. Since we are training primarily aerobically, we will pick distances that take approximately three to six minutes to cover. You will overload your system by reaching a heart rate of at least 90% of its maximum (>180 BPM). Progression will come from increasing the work or work rate or by decreasing the rest interval each workout. The rest interval can be based on recovery to a certain heart rate or a ratio of rest time to work time. Because of the high intensity nature of the exercise, you should not perform it more than two times per week.

Fartlek training is a nice, but inexact, way to incorporate variety into your training while increasing the intensity. It combines elements of aerobic intervals and steady state training. For example, you could sprint the straights of the track and jog the curves while continuing for one to three miles. This can be repeated for the entire distance.