

Heart Health

Understanding Pulse-Rate and Training

Pulse-Rate is important for understanding one's conditioning and pursuit of optimal training. It is not an exact science, meaning no rules apply to all people. Much of one's capacity to train at optimal VO₂ Max (maximum volume of oxygen, or peak anaerobic threshold) is 75% heredity and 25% trainability. Many studies have proved this. Each individual's body is different, and the capacity to train will vary. So, do not worry - your body will tell you your capacity.

To clarify, aerobic training is where you can walk for a length of time and increase your capacity to go farther through training over a period of time (weeks, months, years). This is usually done at a pace where you can talk, but you are not strolling. This would be at the rate of 70-75% of your maximum heart rate, anaerobic threshold. But, as this heart rate changes (goes down in number) as you become more conditioned. This means once you are more conditioned, you can go faster, longer at a lower heart rate. Your body, heart, muscles, etc., are getting used to the activity, and are more conditioned.

Walking at 75-85% anaerobic threshold one can still talk, but only in short infrequent sentences or words. The body is now working harder for oxygen to move forward at this pace. The muscles are now demanding more oxygen and energy. This is still an aerobic pace, bordering on anaerobic threshold.

Walking at 85-95% is now anaerobic. This is where your body is now producing lactic acid. This training level should not be more than 25% of your total weekly mileage (no matter what you are training for).

Walking at 100% is done to determine your total capacity to move oxygen through the heart, lungs and thus to the muscles. This cannot be done over any length of time. (100-meter, 200-meter sprinters are at this capacity.)

As one becomes more conditioned the numbers change in these ranges. The Maximum does not vary much. What changes is when you reach anaerobic training capacity. (It's a lengthy explanation which is best done with charts.)

Why know this information? It's crucial to understanding your body and training capacity. And this is vital to all athletes. The anaerobic training level (85-95% threshold) will vary depending on the sport. So your heart rate at this level for racewalking will not be the same for swimming, etc. And the pulse rate at this level will change with conditioning.

Assessing your condition

There are two major numbers to attain when starting to understand your conditioning. Your resting pulse (taken in the morning BEFORE you get out of bed), and your VO₂ max., anaerobic threshold - maximum heart rate. To get a true accurate result for the maximum, one would need to see a sports doctor for a treadmill test and have lactate level taken. Most people do not have this available. So, the general manner is for the athlete to warm-up at 70-85% capacity. All parts of the body are warmed up, muscles and heart. Then sprint at all-out speed and capacity for 1-2 minutes. Generally this is to the point where you cannot go any farther. That pulse rate is your anaerobic threshold. This is not a wise choice for the unconditioned.

So a simple formula has been determined, through testing and age calculations. The numbers can vary depending on heredity, but it does work. Maximum heart rate: 220 minus age. There is a + or - 10 beat discrepancy for women over 50 and under, and + 10 for men over 50. The calculation was made in studies where they found that the average 20-year old college male had a maximum heart rate of 220. The heart rate declines by 1 beat per minute each year. So, that young fellow's maximum would be 200. [Note: Medications can affect your maximum heart rate. For example, calcium or beta blockers put a "ceiling" on your maximum

heart rate. Do check with your physician regarding questions you may have regarding your current physical condition.]

As an example: Diane is 59 years old. Maximum heart rate should be $220-59 = 161$. Well, remember, I'm an over-50 female and I'm conditioned. I can go to 180, all out. So, adding 10 to my 161 = 171. This is close enough. Believe me, I don't plan to get to 180 very often. According to the formula my 70-75% heart rate (aerobic) would be 119-128, 75-85% = 128-145, and 85-95% (anaerobic) = 145-162. My current resting pulse is 46.

In knowing the two numbers; resting heart rate, and $220-\text{age}=\text{maximum heart rate}$, you can now understand your capacity and how it changes through conditioning. This understanding can also tell you when you have not recovered from a hard workout and need to rest or change your workout. It will also tell you when you are over-training - heart rate does not stay in the values you want when training at certain percentages. Many people tend to over-train without knowing it. If the resting pulse rate is elevated, slow down until your body has recovered. Debbie Lawrence, three-time Olympic racewalker, was a firm believer in checking her resting heart rate to determine her training. One's resting pulse will become lower as conditioning improves, so check it often.

Taking your Pulse

Some people find it easy, some don't. The hardest pulse to find is your resting pulse. It may take several tries because your body is at rest. I use the two-finger method. You have several locations of arterial pulse points on your body. The two most commonly used are the wrist and the neck, a couple inches below the jaw line. Keep in mind pressing hard will not aid in getting your heart rate. Do not do this! A light touch will give the same result. I generally take mine for 10 seconds and multiply by six. Some take theirs for six seconds and add a "0". This number is your heart rate per minute. Pulse Monitors are valuable. Several members use them. The athlete can monitor his/her condition (heart rate) throughout the workout, aerobic or anaerobic. I personally can't wear one. But I do monitor often during a workout.

Whether you are just starting out, or a competitive athlete, it is important to understand your (personal) capacity. It's valuable information in understanding your body's ability to train, condition, and remain fit (uninjured from overtraining or training at the wrong level - pushing the envelope too soon). I keep a monthly training form on my bulletin board, tracking my mileage, pulse rate, and heart rate percentage of training. I can keep track if I'm slacking off, or over doing it.

Pulse-rate training is a wise approach to conditioning. Put it to use.

Diane Graham-Henry is a USA Track and Field Certified Coach

References:

Training, Lactate, Pulse-Rate, Peter G.J.M. Janssen M.D. (highly technical but equally informative for many sports.)
Advanced Race Walking, The Serious Race Walker's Guide to Competitive Success, 4th Edition, Martin Rudow (Diane's favorite)
Training for Speed and Endurance, Peter Reaburn and David Jenkins, Exercise Physiologists. (Another Diane favorite)
The Complete Guide to Racewalking, Technique and Training, Dave McGovern (Very good read)
Smart Running, Hal Higdon. Senior writer for Runner's World. (Good advice for master athletes.)