

## HOW TO OBTAIN OPTIMAL RESULTS USING A HEART-RATE MONITOR

Heart rate monitors are a simple and effective training aid. By running within specific heart rate training zones, you help ensure that you train at the appropriate intensities for optimal results. Without realizing it, however, you may be training harder or easier than planned unless you know your true maximal heart rate, your resting heart rate, and take into account the various factors that influence heart rate while running. In this column we will look at how to determine your maximal heart rate and your individualized training zones. In next month's column, we will look at several important factors that affect your heart rate during running.

**Maximal heart rate:** Your maximal heart rate (max HR) is simply the fastest that your heart beats during maximal effort running. There are several formulas used for estimating max HR, but they only provide rough estimates. Your actual max HR may be as much as 20 beats per minute higher or lower than predicted. Using an estimated max HR can lead you to train too hard or not hard enough, so you should check your actual max HR.

You can accurately determine your max HR during a hard interval session. An appropriate workout is to warm up thoroughly and then run 3 high intensity repeats of 2 to 3 minutes up a moderate hill, and jog back down right away after each one. If you run the first hill at 90% effort, and then run the last 2 all out, your heart rate should reach its maximal level during the 2nd or 3rd repeat.

Interestingly, there is evidence that max HR changes with an individual's aerobic fitness. Your max HR decreases when you make large gains in your cardiovascular fitness, and increases again if you have the misfortune to go from being very fit to out of shape. An untrained person may experience a 7% decrease in max HR with training. As your max HR changes, your heart rate training zones may need fine-tuning. If you have substantially increased your level of training you should test your max HR every 6 to 12 weeks to check whether it has decreased. Similarly, if you have had a prolonged break from running, you should check your max HR because it may have increased during your time off.

**Heart Rate Reserve:** Many runners calculate their heart rate training zones as a percentage of their max HR. Basing training zones on a percentage of your heart rate reserve (HRR) is a more accurate way of prescribing training intensities because it takes into account both your max HR and your resting heart rate. Your HRR is simply your max HR minus your resting heart rate, and reflects how much your heart rate can increase to provide more oxygen to your muscles.

To calculate your HRR, you need to know your resting heart rate. The best way to determine your resting heart rate is to wear a heart rate monitor to bed and check your heart rate as soon as you wake up. Do this for several days, and use the lowest rate as your resting heart rate. If you wake to an alarm, your heart rate may be elevated, so check your resting heart rate when you are able to wake naturally.

### Setting your personal training zones

The heart rate training zones that I use are presented in the table below. Once you know your resting heart rate and max HR, calculating training zones based on HRR is easy. For example, Carolyn, a 40 year old marathon runner, has a max HR of 183 and a resting heart rate of 47 beats per minute. Her heart rate reserve, therefore, is 183 minus 47, which equals 136 beats per minute. To calculate Carolyn's training zones, she simply multiplies the appropriate percentage times her heart rate reserve (136) and adds her resting heart rate (47).

### Heart rate training zones

Workout	Percent HRR
Lactate threshold	76-88
Long runs	65-78
Recovery runs	<70

Much of the value in using a heart rate monitor is in keeping highly motivated athletes from training too hard on their recovery days. Staying below 70% of heart rate reserve allows you to recover without having to run uncomfortably slowly. Your long runs should not be easy, nor should you hammer yourself into the ground. Starting long runs at about 65-70% of heart rate reserve, and gradually increasing the effort up to the high end of the range works well for most runners. The appropriate training zone to improve lactate threshold varies with fitness, but for most runners, the correct zone is in the range of 76-88%. If you are a novice runner, then stay in the 76-83% range. More experienced runners should do these sessions in the higher end of the range.

Let's calculate Carolyn's heart rate training zones. During recovery runs, she should keep her heart rate below  $[(136 \times 0.7) + 47] = 142$  beats per minute. Her long runs should be in the range of  $[(136 \times 0.65) + 47] = 135$  to  $[(136 \times 0.78) + 47] = 153$  beats per minute. She should start her long runs towards the low end of this range and finish towards the high end. Carolyn's lactate threshold training zone is  $[(136 \times 0.76) + 47] = 151$  to  $[(136 \times 0.88) + 47] = 166$  beats per minute. As a highly experienced runner, she should do her lactate threshold training in the upper half of this zone.

*(This column originally appeared in [Running Times Magazine](#).)*