

## TRAINING METHODS

There are three major methods of training. Heart rate training, training by recent race times and training by your rate of perceived exertion. Each has advantages in certain situations. Here are the basics of each type of training and some recommendations.

### Heart rate training

Training by heart rate has become very popular over the past several years. When training by heart rate, you wear a belt around your lower chest that has a sensor built into it. The sensor sends heart rate data to a receiver that you wear on your wrist, similar to a watch. You monitor your heart rate by checking the wrist receiver.

Heart rate training is based upon two heart rates - your maximum heart rate and your target heart rate.

Your maximum heart rate is the maximum rate at which your heart will beat. This can be determined by a monitored treadmill test or can be estimated with the formula of 220 minus your age. If you are 40 years old, your estimated maximum heart rate would be  $220 - 40 = 180$  beat per minute.

Your target heart rate is a range of rates that your training program will specify for each workout. You will run at a pace that elicits the desired heart rate. You will either slow down or speed up in order to keep your heart rate at the desired level. The theory is that each of the different types of workouts - easy runs, speed workouts, lactate threshold runs, hill workouts; are best performed at a specific heart rate level.

Target heart rate is calculated using one of several formulas. The two most commonly used are the percentage of maximal heart rate and the Karvonen formula.

#### *Percentage of Maximal Heart Rate*

This formula is maximum heart rate x desired training percentage x 1.15. For example, our 40 year old athlete will have an estimated maximum heart rate of 180 beats per minute. If this athlete wanted to run at a pace that results in a heart rate of 70% of maximum heart rate, the formula would be as follows:

$$180 \times 70\% = 126$$

$$126 \times 1.15 = 145 \text{ beats per minute.}$$

In this example, the target heart rate for your training run would be 145 beats per minute.

Your target heart rate will vary according to your fitness level and what type of workout you are doing. It may vary from 50% of your maximum heart rate to over 90%.

#### *Karvonen Formula*

The Karvonen formula is similar to the percentage of maximal heart rate. The difference is that the Karvonen formula incorporates the resting heart rate. Resting heart rate is the rate that your heart beats when at rest. It is best measured just before getting out of bed. Measure your pulse at your wrist or neck. Count the number of beats in 10 seconds and multiply by 6. This will give you the beats per minute.

The Karvonen formula is maximum heart rate - resting heart rate x desired intensity + resting heart rate. Using the same 40 year old, desiring an intensity of 70% of maximum heart rate, with a maximum heart rate of 180 bpm and a resting heart rate of 80 beats per minute, the formula would be as follows:

$$180 - 80 = 100$$

$$100 \times 70\% = 70$$

$70 + 80 = 150$  beats per minute

The physiological difference between the two methods is heart rate reserve. The Karvonen formula factors in this reserve which is basically the reserve of the heart to increase its output. Both formulas are very commonly used. Of the two, the Karvonen formula is usually the most accurate.

#### *Advantages and Disadvantages*

One of the most common errors committed by beginning runners is running too hard on easy run days. Heart rate training offers the advantage of not letting you run harder than you should be on your easy days. You can set the monitor to alert you if your heart rate goes too high.

The main disadvantage of heart rate training is a lack of accuracy. Estimated maximum heart rates are based on statistics that have a built in variation of up to 19 beats per minute. This means that if you are exercising at 70% of your maximum heart rate, you may be working out at up to 17 beats per minute too fast or too slow. There are many people who can exercise comfortably at up to 36 beats faster than the recommended maximum and those who must keep their heart rate well below the recommended maximum. Your training heart rate will also vary. High heat conditions, dehydration, fatigue, stress, illness and medications can all cause your heart rate to increase, which will decrease the accuracy of heart rate training. Your heart rate will also increase in the last half of workouts or races due to a condition known as cardiac drift.

#### **Training by Current Race Times**

You can use your current 5K or 10K race times to calculate an appropriate training pace. If you complete your 5K races at the maximum intensity that you can maintain, you are running at just over your anaerobic or lactate threshold, which is the pace at which you begin to use more energy than your body can supply aerobically. In a 10K race you are running just under, at, or just over your anaerobic threshold pace. Using your race pace as a guideline, you can calculate a relatively accurate training pace for each type of workout that you do.

The advantage to this type of training is that it is customized to each individual, instead of relying upon general statistical data. Your training pace will also adjust itself as you gain or lose fitness.

The disadvantage of race time training is that you must have completed and consistently compete in races. You must also compete at a maximum intensity in the races. If you are new to running or have not completed at least 5 races at your best intensity, this may not be an accurate method. You will have to compete in races on a consistent basis in order to get updated feedback on your race times. As your race times improve, you will increase your training pace. If your race times decrease, you will also decrease the pace of your training runs.

#### **Training By Rate of Perceived Exertion**

Listening to your body has a lot of advantages. There are more variables involved in how fast you should run than just heart rate. Your stress level, physical health, emotional health, temperature, humidity, the time of day, the last time you ate and what you ate, all contribute to the intensity at which you should run. If you listen to your body, it will tell you all of these things.

The rate of perceived exertion (RPE), also know as the Borg scale, was developed by Swedish physiologist G.A.V. Borg. This scale rates exercise intensity from 6 to 20 depending upon how the athlete feels or perceives his or her effort.

The scale is as follows:

Rating Perception of Effort

6 Minimal

- 7 Very,very light
- 8 Very,very light +
- 9 Very light
- 10 Very light +
- 11 Fairly light
- 12 Comfortable
- 13 Somewhat hard
- 14 Somewhat hard +
- 15 Hard
- 16 Hard +
- 17 Very hard
- 18 Very hard +
- 19 Very,very hard
- 20 Maximal

You can get an approximate heart rate level for each rating by simply adding a zero to each rating. For example a rating of 12 will result in an approximate heart rate of 120 beats per minute. Your RPE will vary depending up the factors discussed earlier. That is the major benefit of this type of training. If your body is strong and rested, you will feel strong and your pace will feel easier. When your body is in this condition, you are able to train harder and the RPE will support this. If you are feel tired and sluggish, it is because your body needs a break. In this condition, your pace will feel harder. Again, this will show up in your RPE and you will train at the proper level for that day.

### **Suggestions**

In the past several years, heart rate training and training in the "Zone" has been the most popular method of training. Many runners, especially beginners, have become preoccupied with their heart rate and will blindly follow it no matter how they are feeling. Heart rate formulas are all based on statistics that have built in variations. Your MHR (maximum heart rate) has a variation of up to plus or minus 19 beats per minute. There is another built in variation of plus or minus 17 beats per minute when you are exercising at 70% of your MHR, which is the "zone" heart rate that has become so popular. That means you could be exercising at up to 30 beats per minute faster or slower than you should be. That is a large potential error.

So what is the best training method? I believe that if you are a competitive athlete that consistently competes in a large number of races, race pace training is a good way to go. This will keep your training pace constantly adjusted to the pace that will give you the greatest improvement in race times. If you are a beginner or are running mostly for pleasure and fitness gains, the rate of perceived exertion is the way to go. This will allow you to customize a training plan with the least amount of calculation or time involved. It will be the most accurate gauge of intensity because it will take into consideration, the current health and strength of your body.