

Heart Rate Zones and Training Intensity

Your training plan revolves around two key axes: volume and intensity.

- **Training volume** simply refers to the amount of training you do, e.g. the total time or number of miles you log. Training volume is easy to quantify by adding up your training hours and mileage.
- **Intensity** refers to the exertion level put forth during training, e.g. your effort, speed/pace, or power output. Whereas volume refers to the quantity of your training, intensity deals with the qualitative nature of your training.

Intensity can be measured in a number of ways. Tools such as the Borg Rating of Perceived Exertion (RPE) scale is one way. The exerciser uses this scale to subjectively evaluate their level of exertion. Speed or pace is another—faster speeds mean higher intensity. Recording power, such as with a power meter on the bike, is yet another. Monitoring heart rate also measures intensity of the workload, as does measuring the amount of lactate in the blood during exercise.

Each type of measurement has advantages and disadvantages. Lactate measurement is the most accurate way to gauge intensity for the endurance athlete. Simply put, lactate in the blood increases as the training intensity increases.

By measuring your lactate levels, we can determine the intensity at which you're working. We can also determine when you've reached your lactate threshold. The **lactate threshold (LT)** refers to the intensity at which the rate of appearance of lactate in the blood exceeds the rate of its disappearance. In other words, when you reach lactate threshold, your bloodstream begins to accumulate more lactate than it can clear. The presence of lactate in your blood isn't a problem in and of itself. However, accompanying the lactate are positively charged hydrogen atoms that make the blood acidic. This acidic environment contributes to muscle fatigue and that burning sensation you feel when you're exercising at a high intensity.

Think of the lactate threshold as the boundary line between aerobic work and anaerobic work. Workloads above the lactate threshold can only be sustained for up to a few minutes before the body must slow down. Workloads right at the lactate threshold can generally be maintained for about an hour. Workloads below the lactate threshold can be maintained much longer.

An important effect of endurance training is to raise your lactate threshold. In essence, your goal is to go faster at a lower level of effort—that is, while staying

aerobic. In order to achieve this, it is important to be able to measure your training intensity. And this is why we began discussing lactate in the first place!

I said earlier that measuring lactate is an ideal way to gauge intensity. But drawing blood during a workout to directly measure lactate levels is impractical. Fortunately, we can correlate your lactate threshold with heart rate and use this information to determine heart rate training zones. Heart rate can easily be measured during workouts with a heart rate monitor. Armed with your heart rate zones, you will be able to pinpoint the desired intensity for each of your training sessions.

In order to correlate your lactate threshold with heart rate and find your appropriate heart rate zones, you will need to conduct a field test. *For more on this, see the explanation of field tests.*