

Understanding Heart Rate Training Zones

Anyone who has ever used a piece of cardio equipment at a fitness club is familiar with the concept of heart rate training zones. A typical set of heart rate guidelines presented on the display panel of a treadmill or elliptical trainer includes three target zones with names like “fat burning”, “aerobic fitness”, and “peak performance”. Each of these names is associated with a target heart-rate range that is given as a percentage of maximum heart rate. For example, the fat-burning zone might be 55 to 65 percent of maximum heart rate, aerobic conditioning 65 to 85 percent of maximum heart rate, and peak performance 85 to 100 percent of maximum heart rate. A formula of 220 beats per minute minus the exerciser’s age in years is used to calculate maximum heart rate.

Research has shown that most people ignore these guidelines and instead regulate their exercise intensity by feel. Specifically, they choose an intensity that feels moderately hard, because (at least subconsciously) they want to work hard enough to get something out of the workout but not so hard that they are uncomfortable. This effort level usually puts the heart rate near the high end of the aerobic conditioning range. And every workout is exactly the same: Challenging but not too challenging.

The results that exercisers get from this approach to training are much better than the results they would get from sitting at home on the couch. But they are much worse than the result they could get from a different approach that included various kinds of workouts with different heart rate targets, some lower and some higher than the heart rate levels people usually hit when they work out by feel. The typical gym exerciser has no idea he or she could get better results from the same amount of exercise with a better approach to heart rate training. That’s because the heart rate guidelines found on the display panel of a stationary recumbent bike at the gym are just too basic. They don’t explain why or how to use heart rate monitoring to get better results.

Heart Rate Zones for Runners: A Better Way

The heart rate training guidelines used in running are more sophisticated and effective than the guidelines that are ignored by most gym exercisers. There are four key differences:

- 1) *Running coaches use more zones—typically five instead of three.*
- 2) *Running coaches use narrower zones.*
- 3) *Running coaches leave small gaps between some zones, so that certain heart-rate ranges are generally avoided in training.*



4) *Running coaches use the individual runner’s testing-determined lactate threshold heart rate to calculate customized heart-rate training zones instead of a general, age-based maximum heart rate formula.*

The heart-rate training zone system used by PEAR is similar to the systems that most running coaches use. Here it is:

Zone Name	Percentage of Lactate Threshold Heart Rate
Zone 1	75-80
Zone 2	81-89
Zone 3	96-100
Zone 4	102-105
Zone 5	106+

A new runner, or even an experienced runner who hasn’t trained by heart rate, is likely to look at these guidelines and say, “Gee, this system seems more complicated than the one on the treadmill I use at the gym.” In fact, the PEAR heart rate training system is actually very easy to use. While it is a little more nuanced than the three-zone system, it’s significantly more effective.

The first step toward embracing the PEAR system is understanding why it’s better. Each of the four key differences between the PEAR system and the fitness-club systems has a specific rationale linked to a specific advantage. Let’s review them briefly.

1) Five Zones Instead of Three

Well-coached runners do a wide variety of different workouts. Each type of workout carries a unique set of benefits that no other type of workout exactly matches. So a training program that includes all of them is more effective than one that includes only some, or just one.

The main factor that distinguishes the various types of workouts from one another is intensity, and, of course, heart rate is a measure of intensity. A system with only three target heart-rate intensity zones is not sufficient to cover the full variety of workout types that a runner should do. A five-zone system is.

For example, recovery runs are low-intensity runs that provide a nice, gentle aerobic stimulus between harder runs. They need to be done in Zone 1. Long runs, on the other hand, are prolonged, moderate-intensity runs that build endurance. They should generally be done in Zone 2. In a three-zone system, Zone 1 and Zone 2 are lumped together into the “fat-burning” zone. So there’s no way to ensure that recovery runs and long runs are done at the most appropriate intensities in a three-zone system.

2) Narrower Zones

In addition to not providing enough zones to cover every type of workout a runner should do, three-zone heart-rate training systems present zones that are too broad to prevent runners from running too hard or too easy in most types of workouts. For example, tempo runs are meant to be done at or very near lactate threshold intensity, which is a moderately hard intensity. This intensity can be very precisely pinpointed with a simple test workout, and research has shown that training at this intensity is an extremely powerful aerobic fitness builder. So it's important to nail lactate threshold intensity in tempo runs.

With PEAR's five-zone system this is easy to do, because Zone 3 is a very narrow heart-rate range that extends from 96 to 100 percent of lactate threshold heart rate. But in a three-zone system, an individual runner's lactate threshold heart rate is likely to fall very close to the upper limit of the aerobic conditioning zone. That zone is so broad that it can't possibly be used to effectively guide tempo runs. A runner could easily do a tempo run at a heart rate near the *low* end of the aerobic conditioning zone and not get nearly enough out of it.

3) Small Gaps Between Some Zones

Notice that in the five-zone PEAR system there is a small gap between the high end of Zone 2 (89 percent of lactate threshold heart rate) and the low end of Zone 3 (96 percent of lactate threshold heart rate) and another small gap between the high end of Zone 3 (100 percent of lactate threshold heart rate) and the low end of Zone 4 (102 percent of lactate threshold heart rate). These gaps may seem a little weird to runners accustomed to the heart rate zone charts found on cardio fitness equipment, on which all three zones are contiguous. Why does the PEAR system have gaps?

The gaps between target zones represent another important way of helping runners avoid going too hard or too easy in different types of workouts. A simple example shows how. As mentioned above, a long run is a special type of run that targets Zone 2, which ranges from 81 to 89 percent of lactate threshold heart rate. A typical long run might consist of 90 minutes of steady running in Zone 2. As was also mentioned above, a tempo run is a special type of run that targets Zone 3, which ranges from 96 to 100 percent of lactate threshold heart rate. A typical tempo run might consist of 20 minutes of steady running in Zone 3 between a warm-up and a cool-down in Zones 1 and 2.

Imagine what might happen if we erased the gap between Zone 2 and Zone 3, perhaps by raising the upper limit of Zone 2 to 92 percent of lactate threshold heart rate and dropping the lower limit of Zone 3 to 93 percent of lactate threshold heart rate. This gives the runner the freedom to run faster in long runs and slower in tempo runs. Now, in the right circumstances a 90-minute long run in Zone 2 would leave a runner moderately fatigued at the end. But if Zone 2 were extended all the



way up to 92 percent of lactate threshold heart rate, such a workout might leave the runner completely exhausted at the end—or even *before* the end.

Likewise, in the right circumstances a 20-minute tempo effort in Zone 3 would leave a runner moderately fatigued at the end. But if the low end of Zone 3 were lowered to 93 percent of lactate threshold heart rate, such a workout might not fatigue the runner very much at all, and wouldn't provide the conditioning stimulus that was sought.

4) A foundation on testing-determined lactate threshold heart rate instead of on a general maximum heart rate formula

Individual heart rate responses to exercise can vary widely based on differences in physiology and fitness. A heart-rate training system that does not account for these differences in prescribing target zones will not meet the needs of each individual runner and will not be as effective as it should be. The 220 – age formula that is used in the fitness club environment does not account for individual differences in physiology and fitness. Research has shown that it does not accurately predict true maximum heart rate in most runners. What's more, maximum heart rate is not particularly relevant to prescribing custom-fitting heart-rate training zones in the first place.

The PEAR system of heart rate training uses lactate threshold heart rate to calculate individual zones instead of maximum heart rate. An individual runner's heart rate at lactate threshold intensity *does* account for the individual's unique physiology and fitness level. Technically speaking, the lactate threshold is reached when a certain amount of lactate is present in the blood and it is typically determined in an exercise laboratory environment. But PEAR has developed a simple field test that accurately determines lactate threshold heart rate without the need for blood draws. The test takes only 20 minutes to do, it's not hard, and there's no math involved. You just follow the audio instructions and PEAR automatically determines your lactate threshold heart rate and calculates your five custom heart-rate training zones.