CVT: Assessing Intensity of Your Cardiovascular Training

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It's a perfect day for a workout! Maybe a ride? Or, possibly a run/walk? Midway through the workout you're working a lot harder. How much harder? If you understand how to assess your cardiovascular training (CVT) effort, you will know for sure. Even more importantly, if you take this knowledge and learn to vary your training intensity, your effort, over the course of your training program—periodize your workouts—you will unleash the true results producing power of periodization.

What is CVT intensity?

Training intensity is the sum of how hard your body is working. It isn't just time, or distance, or level of breathing; rather, it's a multi-dimensional combination of how long, degree of effort and how often you're placing your body under the stress of training.

There are several ways to measure your training intensity, including:

- Perceived exertion.
- Heart rate zones.
- Heart rate zones in combination with time ("training load").
- Calories expended.
- Average watt output.

We'll focus on the first three...

Perceived exertion

Despite the problem with Rate of Perceived Exertion (RPE) (subjectivity versus actual physiology), a subjective rating scale can be a beneficial beginning benchmark. Try, for example, the Post Workout Rating Scale (PWRS) (see table at right), created by Carl Foster, Ph.D., Director of Exercise Physiology at the University of Wisconsin-La Crosse. (Note: Dr. Foster also suggests that you rate yourself thirty minutes after completing a workout. He has found that after a 30-minute recovery your perception of the intensity is more accurate.)

RPE	Description of Feeling of Effort	RPE	Description of Feeling of Effort
0	Rest	6	More than hard
1	Really easy	7	Extremely hard
2	Easy	8	At my limit
3	Moderate	9	Past my limit
4	Sort of hard	10	Destroyed
5	Hard		

Maximum Heart Rate and Heart Rate Zones

Measuring heart rate is simple, and thanks to heart rate monitors, very accurate. Heart rate is measured in beats per minute (bpm). One of the best ways of measuring training intensity is to anchor intensity based on maximum heart rate, the highest number of beats per minute that your heart can contract or beat.

The first step in accurately assessing your training intensity is determining your maximum heart rate. Thankfully, maximum heart rate testing to exhaustion isn't the only choice. Instead, you can use a sub-maximal test (see below) that keeps your heart rate below its maximum rate and still gives you a fairly accurate measure of your maximum heart rate.

Sub-max test using the Post Workout Rating Scale

Step 1. Warm up adequately for 5-10 minutes.

Step 2. This is the "easy" part of the test. Select any CVT activity that you enjoy such as walk-jog-run. Do this activity for 2 minutes at a "really easy" to "easy" effort or an RPE of about 2.

Record your peak heart rate at the end of 2 minutes: _____ bpm

Step 3. This is the "sort of hard" part of the test. Do the same activity for the next 2 minutes and increase your effort to a level that feels like you are working at an RPE between 4 and 5.

Record your peak heart rate at the end of 2 minutes: _____ bpm

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Step 4. This is the "more than hard/extremely hard" part of the test. Increase your effort for 2 minutes to a level that feels like you are working at an RPE of 6 to 7.

Record your peak heart rate at the end of 2 minutes: _____ bpm

Step 5. Enter your "easy," "sort of hard," and "more than hard" peak heart rates into the equations below to arrive at three separate estimates of your maximum heart rate.

Your "easy" maximum heart rate = _____ + 60 = _____ (estimate #1)

Your "sort of hard" maximum heart rate = _____ + 40 = _____ (estimate #2)

Your "more than hard/extremely hard" maximum heart rate = _____ + 20 = _____ (estimate #3)

Step 6. Average your three estimated maximum heart rates to arrive at a single estimate:

est. #1 _____ + est. #2 _____ + est. #3 _____ = _____ (sum) ÷ 3 = _____ bpm

This number is your estimated maximum heart rate.

Note: This may sound strange, but it's true—maximum heart rate is sport-specific. For example, triathletes must measure their maximum heart rate in each of their sports. So, if you train in different sports or on different pieces of cardio-equipment, you need to take sub-max tests for each.

Now, with maximum heart rate in mind let's focus on training intensity—heart rate zones. A heart rate zone is a range of heart beats per minute and, in the table at the top of the next column, each zone represents a 10% range of your maximum heart rate separating different workout levels and corresponding physio-metabolic results—warm up, endurance, aerobic capacity, anaerobic capacity and max effort.

Taking intensity to the next level: Training Load

Heart rate serves as a nice proxy for how hard you're working, but to get an even more accurate picture of the amount of stress your body is experiencing, take a multi-dimensional approach to measuring training intensity called training load.

Heart Zone	% of Max Heart Rate
1	50-59
2	60-69
3	70-79
4	80-89
5	90-100

We address training load in two ways, external and internal. External training load uses distance, speed, environmental factors, altitude, and much more. Here we'll discuss internal load.

Internal training load is the product of three variables: exercise intensity (as measured by heart rate), exercise frequency (how many workouts), and exercise time (duration in each zone). The product of these factors gives you a measurement of your internal training load. The product of the training load formula is the sum of internal training load.

$L = I \cdot F \cdot T$

- I is a zone number (1, 2, 3, 4, or 5).
- F is frequency.
- T is the elapsed time in minutes that you spent in a particular zone.
- L is the measurement of total exercise training load.

Now that you have the ability to quantify your training intensity and calculate your training load, you have the tools to vary your training load over the course of your training program. Periodizing your training—varying the amount and sequence of your training over time—will help you reach your maximum potential no matter what your training goals.

References

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