# *Training Tips for Cyclists*

## Plus a Special Section on Heart Rate Training

**Billy Dean**

# « TRAINING TIPS FOR CYCLISTS »

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## « INTRODUCTION »
## Young or old, aging changes you.

### Aging

- Your heart delivers less oxygen to your muscles because your maximum heart rate and the amount of blood your heart can pump on each stroke decrease with age.
- You've also lost muscle mass and produce less of the hormone needed for muscle repair.
- You've lost more fast-twitch muscle fibers than slow-twitch muscle fibers, which makes fast, intense riding more difficult than slow, moderate riding.
- You can't inhale as much oxygen nor exhale as much carbon dioxide because the elasticity of your lungs has decreased and the resistance of your airways has increased.
- You can't maintain intense riding as long as you once did, because the lactic acid produced by fast riding isn't dissipated as rapidly.

### Fitness

One of the ways we tend to deal with aging is to do ***fewer*** short, intense rides and ***more*** long, slow rides. Long, slow rides are just easier than fast, intense rides. And aging motivates us to focus more on merely ***maintaining*** our present fitness than ***improving*** it. So we slip into long, slow rides as a comfortable way to surrender our youth gracefully. For some, that is a wise and reasonable approach to cycling.

### Goals

Studies show, however, that you can ***increase*** your fitness well beyond the age where research predicts you will slow down. How? By combining endurance and speed training. That will produce your ***best*** overall performance with your present fitness. It will also help you reach your ***potential*** fitness in ***less*** time.

Why? Because short, intense rides have ***more*** effect on your fitness than long, slow distance. And fewer long, slow rides give you more time to recover for the next intense ride.

If you are ***not*** satisfied with your present fitness, the tips in this guide will help your reach your potential fitness by training ***smarter***, not by struggling ***against*** the effects of aging.

## « STANDARD INTERVALS »

One of the ways we deal with aging is to do ***less*** short, intense rides and ***more*** long, slow rides. But a combination of distance (endurance) ***and*** intensity (speed) will produce your ***best*** overall performance. And short, intense rides will have ***more*** effect on your fitness than long, slow distance. Fewer long, slow rides will also give you more time to recover for the next intense ride.

Intervals, in other words, are the most effective way to improve your cardiovascular fitness. Pushing your heart rate into the high aerobic and anaerobic levels on a regular basis improves your heart, your lungs, your muscles, and your ability to mentally deal with the muscular discomfort of riding fast. Intervals are more effective when you.

- Limit your repetitions to 2 or 3 because most of the training effect comes from the first interval, and much less from a second and even less from a third.
- Add intervals to your training schedule only after you've got an aerobic base of at least 500 miles of riding at a steady, moderate pace.
- Pay attention to intensity (heart rate), duration (1-2 minutes), frequency (2-3 per week) and recovery (48 hours).
- Maintain the total hours you cycle per week with a combination of distance (endurance) and intensity (speed).

## Nutrition

Keep your glycogen stores high so you can handle more intense riding. Most cyclists have enough glycogen stored in their liver and muscles for about two hours of moderate intensity. When glycogen runs out, the body begins to burn fat, which can lead to bonking. So make sure you ingest 40 grams of carbohydrate per hour **during** your rides. Most energy bars

contain about 40 grams of carbohydrates.

Your glycogen is low **after** a ride, but your blood flow will remain high for an hour or so. That hour after a ride is a glycogen window during which your body will convert the carbohydrates you eat more rapidly than normal. So eat or drink carbohydrates as soon after a ride as possible to ensure adequate glycogen recovery.

**Recovery**

Let your body tell you when it's ready to ride again. Your body repairs itself at night, while you sleep. So make sure you get adequate rest. If you need an alarm clock to get up in the morning, you probably didn't get enough sleep.

## « FARTLEK INTERVALS »

When I was a competitive runner and swim-bike-run triathlete, I did intervals twice a week—on the track, on my bicycle and in the pool. They weren't fun, but I never thought of them as something I was struggling against. They were just a necessary aspect of my training so I could achieve my competitive goals, which were to win or place in my age division and improve my personal best times.

Intervals are still not fun, but they are still necessary, because I still have goals.

- Slow the aging process to enjoy cycling as long as possible.
- Stay fit enough to continue riding with my cycling friends.

But intervals on the same day and the same route week after week can cause boredom and burnout. So I limit my standard, scheduled intervals to once a week, and add brief periods of more intense riding to my long and short rides.

This type of interval is called a fartlek, a Swedish word for speed play. Fartleks are a less-structured form of interval training. They allow me to be flexible, to listen to my body so I can add short periods of intense cycling when I'm feeling good. Fartleks are a great way to turn grinds into grins. Here are a few to consider.

### Pole Sprints.

Sprint from one telephone pole to the next at your maximum aerobic speed--the edge of your anaerobic threshold. Then spin easily for 4 poles. Repeat 3 times.

### Hill Repeats

As you get near the hill, select a lower gear than you normally would. Stay seated and spin fast two thirds up the climb, then shift up, stand up and pedal over the top. Let your momentum carry you over and down to the next hill.

**Breakaways**

The last person in line charges past the group. When she's about 200 yards ahead, the pace line works to pull her back. Everyone rides easily for a few minutes, then another rider springs from the rear. Repeat 3 or 4 times.

**Chases**

Two riders stop, allowing the others to continue in a pace line. Then the two work together to chase down the group. Repeat with pairs of riders.

**Surges**

Stand and accelerate for 10-30 seconds, or until you spin out the gear, then sit down and spin 10 RPM faster. Hold this cadence for five seconds, then return to normal pace. Repeat 3 or 4 times every hour.

**Pickups**

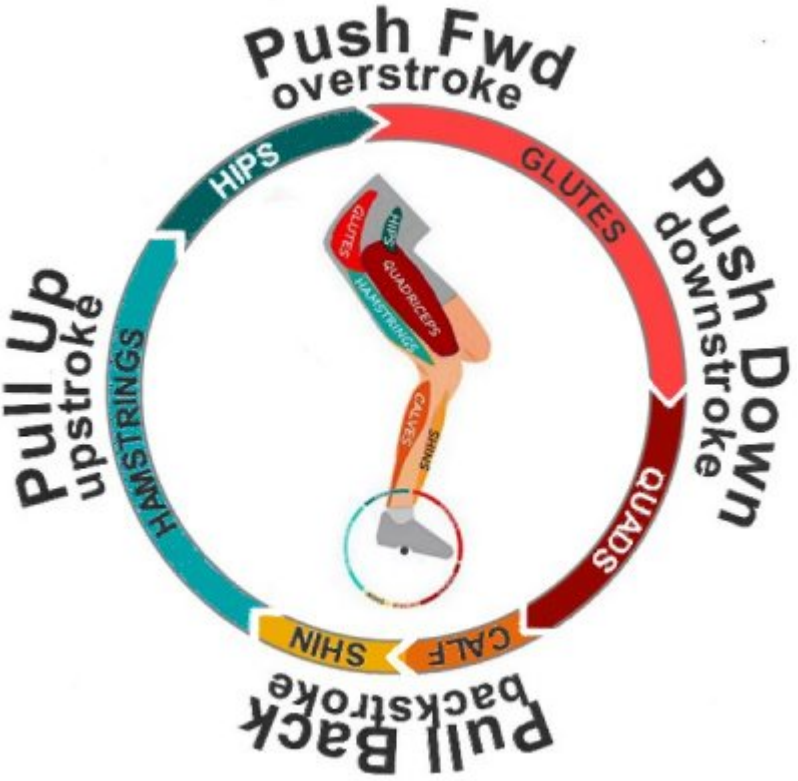
Get out of the saddle and accelerate away from stop signs, over short hills, out of turns or around a car parked in your bike lane—check your mirror!

**« SPINNING »**

**Take the stomp out of your spin!**

Learning how to spin correctly will increase the effectiveness of your distance and speed training. Spinning while sitting is smoother and more efficient than stomping while standing because it applies power through the entire 360 degree stroke by engaging all your leg muscles, not just your quadriceps. Stomping does, however, deliver more power to your pedals. So stand and stomp for short climbs or when accelerating, and sit and spin on long climbs or when drafting.

You can't spin while standing, but you can stomp while you're sitting. So becoming a better spinner is finding ways to take the stomp out of your spin. Start with a push-and-pull pedal action by pulling back with one foot and pushing forward with the other, as if you are trying to scrape mud off your shoes. Then practice applying this push-and-pull technique throughout the entire cycle.



**« SEAT POSITION »**

**Maximize your power and minimize your fatigue.**

The purpose of adjusting the vertical (up/down) and horizontal (forward/back) position of your seat is to spread the load *evenly* on your quads, hamstrings, glutes, hip flexors and calves. The correct position of your seat will minimize your fatigue, maximize your power, and lessen the load on your arms and torso, which support your weight on the bars. If your seat position is spreading the load evenly on all muscle groups, you should be able to get off the bike and walk up stairs without any muscle group complaining excessively. The information below will get you started, but you'll get a more comprehensive presentation of this important topic at...

**https://www.bikefit.com**

Keep in mind that your flexibility will affect the position of your seat. Cycling can cause your muscles to shorten and therefore limit your flexibility. Tight muscles not only put you at risk of injury, but decrease your range of motion and therefore the power you can deliver on each stroke.

Hip Flexors, for example, do not extend completely when cycling. This can make them tighten up over time and that can make it more difficult to activate your glutes. Tight hamstrings can also minimize engagement of the glutes, and glutes are one of the strongest muscles in your body. If your flexibility is preventing the glutes from contributing to the downstroke, you are placing the load entirely on your hamstring and quads. And that can lead to tight quads, tight hamstrings and lower back pain.

The Internet is a good source of stretching exercises for cyclists, and most have diagrams or a video to help you understand how to do them. Most blogs recommend that you do them *after* a ride, and that has proven to work best for me. Warmup for 10-15 minutes at a slow-to-medium cadence on a

relatively level road *before* the ride, then stretch *after* your ride for 10-15 minutes.

## Seat Height

Your **quads** contribute most of the power on the *down stroke*. Higher seat positions *increase* the load on your quads, and *lower* positions *decrease* the load on your quads. You should be able to walk up a flight of stairs after a ride without your quads screaming at you. If you have to struggle up those stairs with *dead* legs you are putting too much load on your quadriceps.

Your **hamstrings** contribute to the downstroke as they extend, but provide most of your power on the *upstroke* as they contract. Power output on the downstroke decreases rapidly if your seat is too high but only slightly if your seat is too low because lower seat positions recruit your hamstrings more effectively. So it's usually better to position your seat too low than too high.

Your **glutes** help your quads on the downstroke, but they also stabilize your pelvis on the seat. Lower saddle heights decrease the mechanical advantage of the glutes, and higher seat positions make your glutes work harder to maintain stability on your seat.

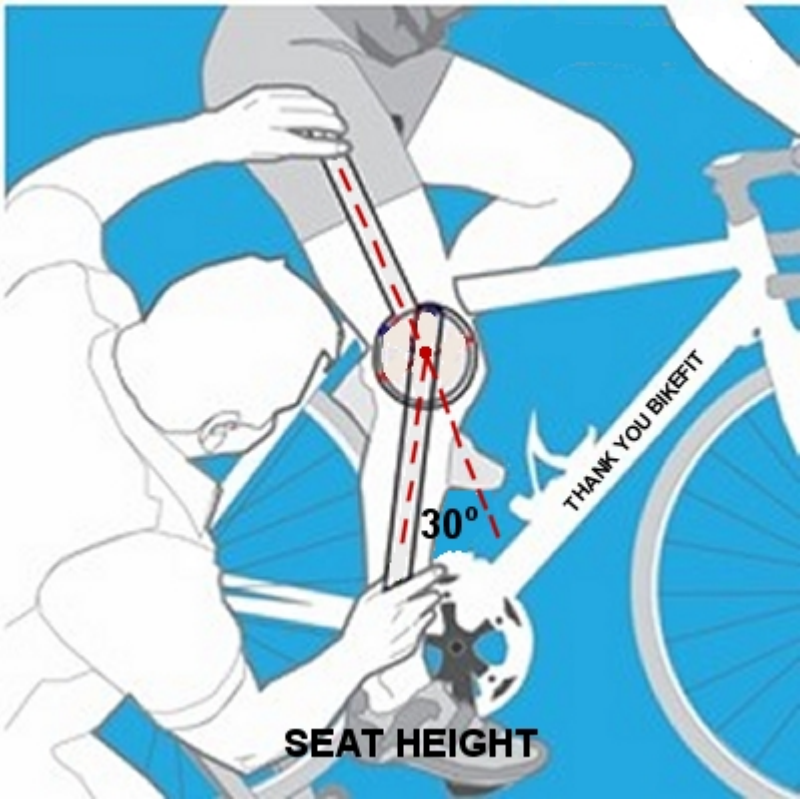
Your **calves** have more fast-twitch fibers than your quads and hamstrings so they can be recruited for sprinting but not for endurance. The best seat position is therefore where your calves are *not* engaged unless you need some short-term speed or acceleration. Higher seat positions lead to a more toe-down style and hence more calf muscle recruitment. Under heavy load, most cyclists drop their heels to disengage the calves. This changes the effective length of your leg, and that changes the effective height of your saddle.

Your **knees** are affected by the vertical position of your seat.

If your seat is too high, you might experience pain behind your knee, or a slight jerk at the bottom of the stroke. If your seat is too low, you might experience pain at the front of the knee, just below the kneecap.

You'll encounter dozens of methods in books and blogs for setting the *vertical* position of your seat to balance these factors and thereby spread the load evenly among all your muscles. There is scientific evidence, however, that the method depicted below yields equal or better results than the other methods. And other than having to purchase a Goniometer ($7 at Amazon), it follows the KISS principle.

- Move your foot to the 6 o'clock position (the bottom of the stroke)
- Measure the angle your knee makes between your thigh and lower leg
- Raise your seat if it's greater than 30 degrees
- Lower your seat if it's less than 30 degrees

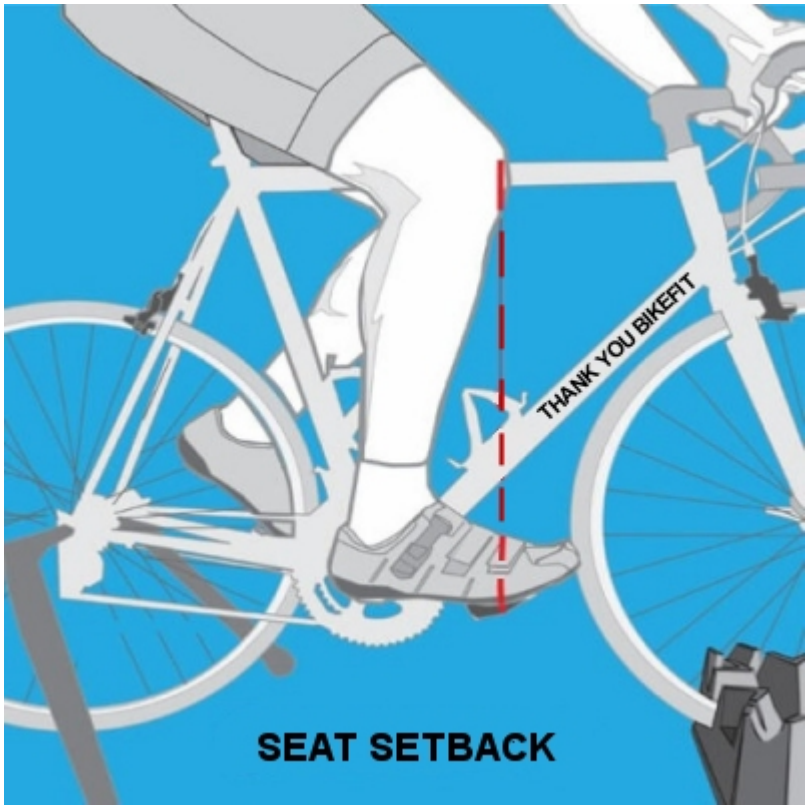


## Seat Setback

The horizontal position of your seat affects the relationship of your pelvis to the crankshaft. Further forward positions will engage your quads more than your hamstrings because you increase your ability to push down more than to pull back. Conversely, further back positions will engage your hamstrings more than your quadriceps because you increase your ability to pull back more than to push down. If your quads and/or calves are burning, you should move your seat back to engage your hamstrings. If you suffer from hamstring fatigue, the seat needs to move forward.

Like seat height, you'll encounter dozens of methods in books and blogs for setting the horizontal position of your seat to balance these factors and thereby spread the load evenly among all your muscles. There is scientific evidence, however, that the method depicted below yields equal or better results than the other methods. And other than having to rig up a do-it-yourself plumb line, it also follows the KISS principle.

- Move your feet to the 9 o'clock and 3 o'clock positions
- Drop a plumb line from your knee cap to the pedal center
- Move your seat forward or back so the plumb line is vertical

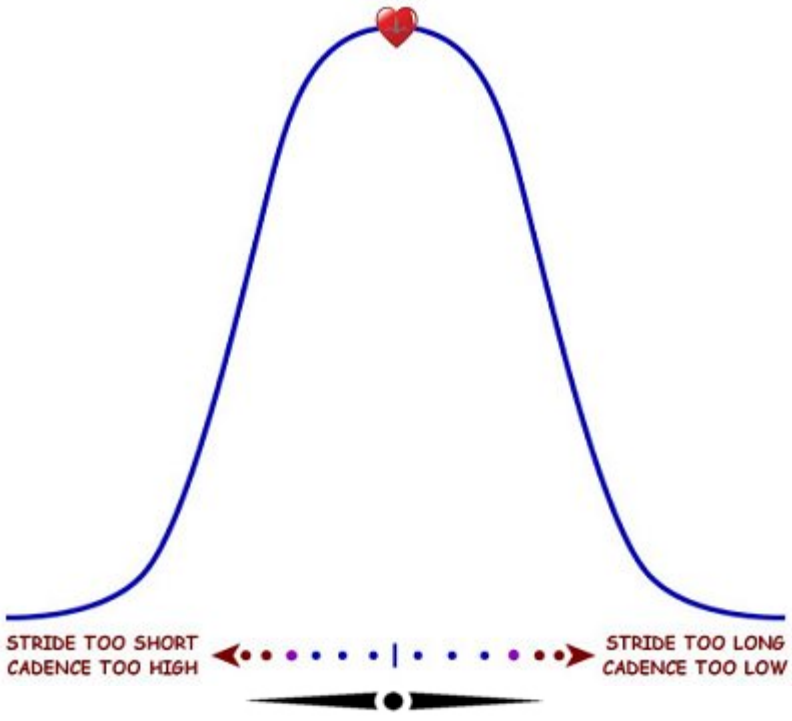

THANK YOU BIKEFIT
SEAT SETBACK

**« CADENCE »**

**Find your own magic number!**

Learning the most efficient cadence for different riding situations will also make your distance and speed training more effective. You'll find anecdotal and scientific evidence on the Internet that a cadence of 90 revolutions per minute is the magic number for most cyclists.

But there's the rub: you may not be like "most" cyclists. Find your own magic numbers for cadence—spin rates that are biomechanically and metabolically efficient for you in different riding situations. Your legs and your lungs, your head and your heart will love it!



## « ZONE TRAINING »

Training in specific zones is a results-oriented way to align your heart, your training and your goals. Each zone is a Training Level (TL) associated with a range of heart rates and training effects. The range of heart rates for each zone are percentages of your Heart Rate Reserve (HRR). Your heart rate reserve is the range of heart beats between your Resting Heart Rate (RHR) and your Maximum Heart Rate (MHR). Your maximum heart rate can be approximated by subtracting your age from 220. You can get closer to your actual MHR by running on a treadmill or cycling up a hill near your anaerobic redline.

| AEROBIC | |
|---|---|
| LOW AEROBIC (Cardio Endurance) | HIGH AEROBIC (Cardio Efficiency) |
| 60-70% HRR | 70-80% HRR |

### Low Aerobic

You burn fat (low octane fuel) and your heart delivers all the oxygen your muscles need. Exercise in this range of heart rates builds cardiovascular endurance. It's the Fat-Burning Zone but you'll lose more weight by burning fat and glycogen and that requires a mix of low and high aerobic exercise.

### High Aerobic

You burn fat and glycogen (high-octane fuel), and your heart delivers all the oxygen your muscles need. Exercise in this range of heart rates builds cardiovascular efficiency ~ the ability to transport oxygen to and carbon dioxide from your muscles. Stroke volume, the amount of blood your heart pumps with each beat, is the key to improving fitness. You notice improvement as an ability to exercise longer before dropping back to the low aerobic zone.

| ANAEROBIC | |
|---|---|
| ANAEROBIC THRESHOLD (Athletic Endurance) | ANAEROBIC REDLINE (Competitive Speed) |
| 80-90% HRR | 90-100% HRR |

**Anaerobic Threshold**

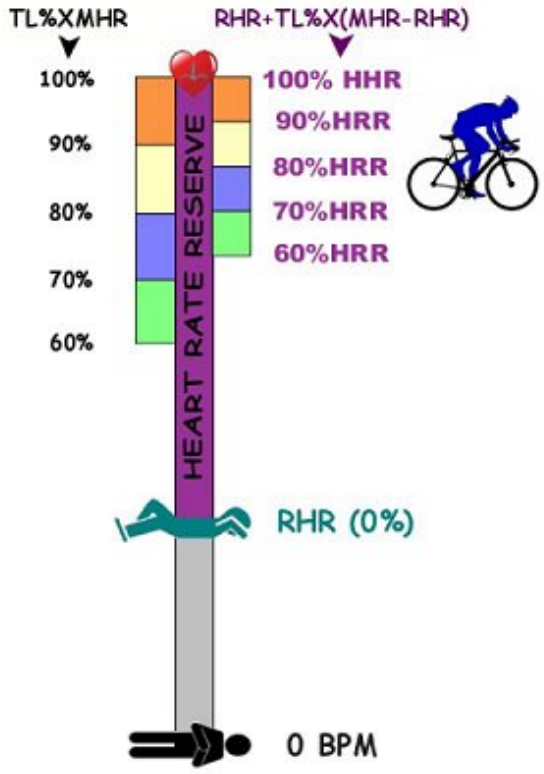
You are at or beyond the point where your heart can no longer deliver all the oxygen your muscles need. You are burning only glycogen but cannot burn it down to just carbon dioxide. This leaves a lactic acid "sludge" of unburnt sugar that causes your muscles to fatigue. Exercise in this zone builds tolerance to lactic acid accumulation and therefore athletic endurance. You notice improvement as an ability to exercise longer in this zone before your muscles shut down.

**Anaerobic Red Line**

You are near your maximum heart rate (MHR). Exercise in this zone builds competitive speed by training fast-twitch fibers in your muscles. You notice improvement as ability to exercise faster over a given distance.

**Zone Training Calculations**

The most accurate way to determine your target heart rate (THR) for a training level (TL) is to base your calculations on a percentage of your heart rate reserve (HRR), ***not*** on a percentage of your maximum heart rate (MHR). The diagram below shows you why.




The left side shows zone training calculations based on your **maximum** heart rate. The right side shows zone training calculations based on your heart rate **reserve**. If you compare the training levels on the left with the training levels on the right, you'll notice that using your maximum rate ***instead*** of your maximum ***and*** resting rates results in ***under*** training.

The calculations on the right side of the diagram reflect the understanding that your heart operates between your RESTING and MAXIMUM heart rates, not between DEAD and MAX. The calculations on the right side of the diagram reflect:

- How your heart actually operates;
- Your fitness, not just anyone your age;
- Changes in your resting rate as fitness improves;
- The goals you seek by not under exercising.

**Do-It-Yourself MHR Test**

The calculations on both sides of the diagram use 220—AGE to determine your maximum heart rate. But the 220—AGE is a **general** formula for the **average** person. So your zone training

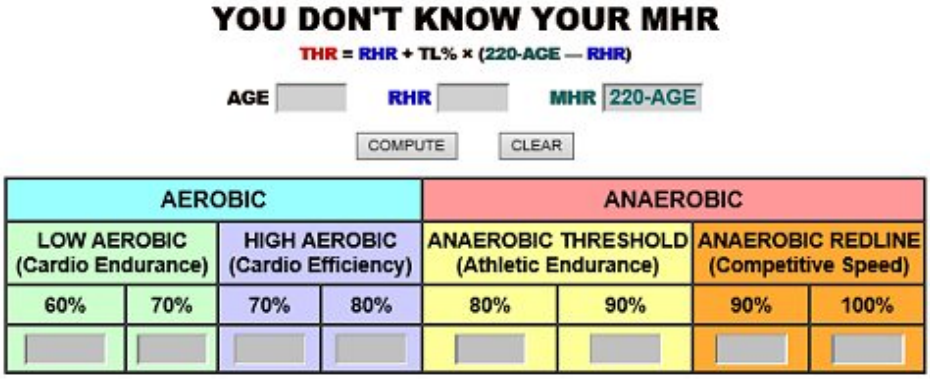
calculations will be even more precise if they're based on your actual maximum heart rate.

Find a gradual hill about 2 miles long. Warm up for 15 minutes, then start climbing the hill. Increase your effort gradually until you're within one or two hundred yards of the top, then stand up and sprint as fast as you can. Record the highest number displayed on your heart rate monitor. Rest, then repeat this test a few times to get an average value.

## Training Zone Calculators

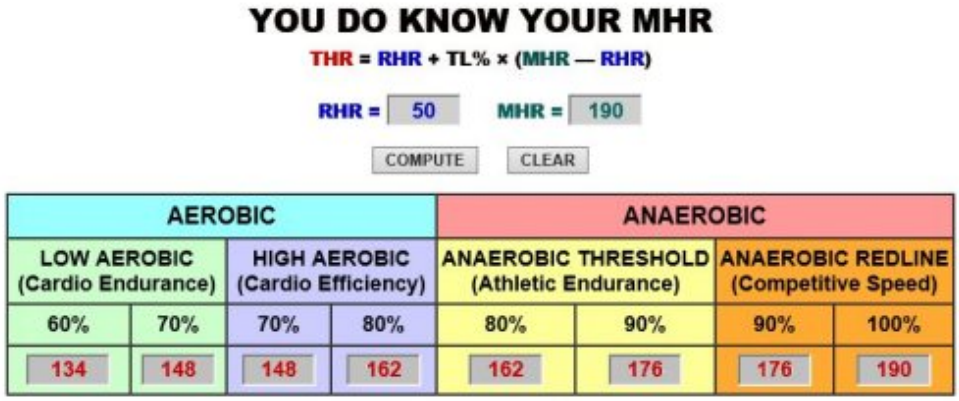
Below are ***screen shots*** of two calculators I designed so you don't have to do your heart rate calculations manually. Both calculators are small HTML files that quickly and accurately display the heart rates for each training level. You don't have to know your MHR to use them, but you do have to measure your RHR. Use the AGE calculator if you do ***not*** know your maximum heart rate. Use the MHR calculator if you ***do*** know your maximum heart rate because you performed the Do-It-Yourself MHR Test.

The screen shot below is for a 30-year old cyclist who does ***not*** know his MHR. He enters his AGE and RHR and clicks CALCULATE and the calculator displays the calculated MHR for a 30-year old cyclist (green) and the heart rates for each training level (red).




The next screen shot is for a 30-year old runner who ***does*** know his MHR. He enters it and his RHR and clicks CALCULATE and the calculator displays the calculated heart rates for each

training level (red).

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You can ***download*** these calculators to your computer from my website. Both are **free** web-based files that will run on your browser. The link below will take you to my download page. Right click each calculator and save it to a folder on your computer. Then go to that folder, double click the filename, and enjoy the convenience of not having to do the calculations manually.

**DOWNLOAD MY CALCULATORS**

## « ABOUT THE AUTHOR »

Billy Dean is a former runner whose knees told him he better find some other way to abuse his body while, paradoxically, having fun. You can find the other books he has published, and make comments about this one, on his Author Page at Amazon.