

REPETITION TRAINING vs. INTERVAL TRAINING

WHAT'S THE DIFFERENCE?

©PEAK RUNNING PERFORMANCE, March-April 2003
By Skip Stolley, Director/Head Coach, TRACK WEST

The lack of a common training language within the sport of running has made it difficult for us to impart and share knowledge. To wit, *threshold training*, *aerobic threshold training*, *tempo running*, *lactate threshold training*, and *anaerobic threshold training* are all terminologies used by different coaches and exercise physiologists to describe the same type of training! That is, 10-40 minute steady pace runs performed just below the pace at which the runner begins to experience oxygen debt, thereby causing the muscles to produce lactic acid. Studies have shown that 1-2 weekly training runs at this pace over the course of 4-6 weeks will significantly raise a runner's aerobic threshold (the ability to maintain a faster race pace with no greater accumulation of lactic acid). But that's a story for another article.

Nowhere is our training semantics problem more confusing than with *Repetition Training* and *Interval Training*—terms that often mean different things to different people. What's more, many coaches and athletes use interval training and repetition training interchangeably. They are, however, vastly different types of training. What is the "interval" in a workout? The interval is the recovery period between bouts of running.

Exercise physiologists have identified repeating bouts of 1-5 minutes of fast running as ideal *repetition training* for distance runners. Regardless of the distance repeated, a general rule of thumb is to maintain a 1:1 run:recovery ratio. The goal of repetition training is to run the distance(s) being repeated in a specific time. The recovery should be sufficient to allow the runner to do so. Otherwise, the purpose of the workout is defeated.

Repetition training is designed to increase running efficiency by decreasing the "oxygen cost" of running and to help the runner become more pace and rhythm conscious. The running intensity generally used for repetition training is current race pace (sometimes called "date pace"), as opposed to goal race pace or goal pace. (Here we go again!) A total time of 25-30 minutes, not including recovery time, is a good upper limit for a repetition training session for highly-trained runners. Repetition training allows a runner to attain and sustain VO₂ max repeatedly and to train at VO₂ max for a cumulative time that is greater than what could be sustained in a single race. VO₂ max is a measure of the maximum amount of oxygen a runner can utilize for aerobic energy production over a given period of time. It is relative to body weight so VO₂ max is expressed in terms of milliliters of oxygen per kilogram of bodyweight per minute. In real terms, VO₂ max indicates how much oxygen a runner can use per minute. It is an important indicator of aerobic fitness—and the higher it is the better.

Aerobic capacity, however, is not the only determinant of distance running performance. While VO₂ max indicates potential capacity, it does not indicate how efficiently a runner uses oxygen. The measure of aerobic efficiency is lactate threshold. Lactate threshold is usually expressed as a percentage of VO₂ max. The average sedentary person has a lactate threshold of about 50% of VO₂ max. World-class distance runners often have lactate thresholds of 80-90% of VO₂ max. Together, VO₂ max and lactate threshold indicate the ability to run middle and long distances at a high level. A high VO₂ max alone is not enough. A runner with a high lactate threshold can often race at a higher level than a rival with a higher VO₂ max.

Interval training is designed to enhance a runner's ability to elevate lactate threshold and to better tolerate lactic acid accumulation in the blood and muscles while running at goal race pace. This is achieved by emphasizing the interval. That means keeping the interval short and insufficient to allow for recovery. Therefore the recovery ratio used is usually 2:1 or 3:1 run:recovery. Interval training should be included in the training of 800m, 1500m, and 3000m runners on a more regular basis than for 5000/10,000m runners because those shorter races are 30-67% anaerobic. In interval training, the bouts of running used are usually shorter than those used for repetition training. They are also usually bundled in "sets" with longer intervals in between to allow for recovery between sets. Research has shown that middle distance runners in particular must be able to tolerate high levels of lactic acid because it is a by-product of anaerobic running. The intensity level used for interval training should be faster than race pace because its purpose is to produce lactic acid by performing the last portion of each run anaerobically. The duration of each run in an interval training session is typically 15-90 seconds (100-600 meters). The interval should not allow full recovery because the objective is not to fully recover, but rather to maintain a high level of lactic acid in the blood throughout the workout.

Interval training is intense, challenging, and painful training. It should not be included more than once every 2-weeks in a training plan. Some athletes may require 2-3 days of easy running to fully recover from a hard interval training session. It is absolutely essential, however, to fully develop any distance runner.

Examples of Repetition and Interval Training Sessions

I am always reluctant to provide coaches or athletes I do not coach with lists of workouts, for there are simply no “secret workouts” out there that will suddenly elevate racing performances to the next level. The key to developing as a distance runner, or as a coach of distance runners, is developing your own results-based philosophy of training. That philosophy will determine *what* different methods of training you employ, *why* you use those methods, *when* you implement those methods within a season-long training plan, and *how* that training will lead to improved racing performances.

My own philosophy is that every race demands a runner be able to do certain things to be successful. Once you determine what those things are, you'll have a menu of things your training needs to address. For example, unlike 1500 and 5000 meter races which usually start fast, settle down to a steady pace in the middle, and finish fast, 800 meter races almost always start fast and finish somewhat slower. This is true for youth, high school, collegiate, masters, and Olympic level 800 meter runners alike. That tells me something about the amount of speed training that 800m runners require to be able to deal with the early speed of their race. The 800 also demands that you be able to run the last 500 meters of the race anaerobically. That means running through the torturous pain of increasing oxygen debt and lactic acid buildup in the muscles. That tells me something about the amount of high-lactate interval training 800m runners need to do. On today's wide-radius tracks, the curves are longer than the straights. Therefore, in the 800, more than half the race is run *on the curve*. That tells me that despite the popular prohibitions against doing so, 800m runners must pass on the curve or be tactically severely limited in the time and space they have to do so.

That said, here are some examples of repetition and interval workouts:

Repetition Workout Suggestions: (**for a 2:05 elite female 800m runner)

- 2x 300m @:47—2x 200m @:29—2x 150m @:21 w/60sec interval btw each // jog 800 btw sets
- 4x (2x 150m @:20 w/walk 50m interval) // jog 800 btw sets
- 2x (300 @:45—600m @:1:36—300m @:45 w/2min interval btw each) // jog 1200m btw sets
- 2x (800 @:2:20 w/60sec interval—1x 400m @:64) // jog 1200m btw sets
- 3x 400 @:60 w/10min interval

Interval Workout Suggestions: (**for a 3:45 elite male 1500m runner)

- Increasing Speed/Decreasing Recovery Reps:
5x (4x 200m @:32-:31-:33-:29-:28 by set w/:50-:45-:40-:35-:30 sec interval by set
- Russian Intervals:
4x (3x 300m @:45 w/jog 100m at :30sec // jog 800m btw sets
4x (2x 200 @:28 w/30sec interval) // jog 400m btw sets
- Tempo Intervals:
2x 1000m @:2:42.5 (65 pace) w/60sec interval—4:00 recovery—4x 500m @ 1:21(65pace) w/60sec interval—4:00 recovery—2x 1000@:2:42.5 w/60sec interval

Repetition Workouts that become Interval Workouts: (**for a 14:00 5000m runner/30:00 10,000m runner)

- Pick-Up Reps: #s 4,7, and 10 become interval training
16x 400m @:67 w/90sec interval (w/ reps #3,6,9,12 @:62)
- Negative-split Reps: last 400m of each becomes interval training
2x (1600m-1200m-800m w/negative-split last 400m) // jog 800m btw reps
[1600s @:3:24 +:62 (=4:26)...1200s @:2:14 +:62 (=3:16)...800s @:66+:62 (=2:08)]
- Sit 'N Kick Reps: 200's become interval training
8x (400m @:65—rest 30sec—200m @:30) // jog 600m btw sets
- Oregon Surges: the surges soon become interval training
2200m-1800m-1400m-1000m surging alternate 200's @:32-:42-:32, etc. // Jog 800 btw reps

Skip Stolley has been a highly successful high school, collegiate, and national club coach. From 1989-99, he was Director of Coaching Education for the Amateur Athletic Foundation of Los Angeles. In 1986, he founded TRACK WEST, a USATF club of post-collegiate men & women distance runners based in Santa Monica, CA. Recently, he reinvented it as the VS ATHLETICS Track Club, a complete track club to support and develop both male and female open athletes in every broad event group...sprints, hurdles, jumps, and throws, as well as the middle and long distance running events. VS Athletics Inc., the Club's sponsor, is the result of the recent merger of SpringCo Athletics and Venue Sports—creating the largest mail order company for track & field equipment, footwear, and apparel in the Western United States.