Choose To Be A Better Runner!

From 1954 to 1963, a small group of runners, under one coach, from one township, won 45 of 63 gold medals in its country's half-mile, mile, 3-mile, 6-mile, steeplechase, cross-country, and marathon events. This included world records in the 800 and mile, in addition to Olympic Gold, Silver, and Bronze medals. This has never been duplicated to such an extent. This validates the training method we are about to discuss.

The primary objective is to create the highest level of fitness we can on which to build specific skills. We do this through long, even-paced running. This applies to sprinters as well as long distance runners. No doubt it would also apply to triathletes, pro cyclists, even swimmers. Continuous use of the muscles for long periods not only develops underdeveloped capillaries within the muscles, but creates new ones and increases our ability to take in more oxygen and use it more efficiently.

Years ago, physiologists at Cologne University established that when muscle groups are exercised continuously for long periods – for two hours or more-- it results in an increase in capillary beds in the muscles and an increase in the number of mitochondria. This promotes more blood flow to the muscle tissues, which translates to more glycogen and more oxygen and more removal of CO2 and other by-products.

Maximum oxygen uptake is one measure of a person's ability to perform endurance events at a high level. It quantifies the amount of oxygen a person can process in one minute per kilogram of body weight. Maximum oxygen uptake can be increased dramatically through long periods of exercise. By dividing oxygen consumption by body weight, you can make comparisons between individuals. For example, Jim Ryun was heavier than Grete Waitz, but we are able to compare their ability to take in and use oxygen. The average college student's maximum oxygen uptake is about 35-40.

An example of maximum oxygen uptake of top level track athletes:

Athlete	VO2 – max(ml/kg/min)
Steve Prefontaine	84.4
Leo Manzano	82.0
Jim Ryun	81.0
Joan Benoit	78.6
Sebastian Coe	77.0
Doug Heaberlin	76.8
Grete Waitz	73.0

Oxygen debt is defined as the amount of extra oxygen required by muscle tissue to oxidize lactic acid and replenish depleted ATP and phosphocreatine following vigorous exercise; or in layman's terms - the amount of oxygen it would take to bring your metabolism back to normal levels.

Each person, according to his physical condition, is able to use a certain amount of oxygen each minute. This can be increased with the proper exercise. As exercise increases in intensity, the oxygen debt doubles, squares, and cubes.

For example, as you increase your effort from a 5:17 mile pace to a 4:33 mile pace, the oxygen requirement goes from 5.08 liters per minute to 8.75 liters per minute. As you increase your effort from a 47.92 400-meter sprint to 47.24 400-meter sprint, the oxygen requirement goes from 28.46 liters per minute to 33.96 liters per minute. These numbers are quite dramatic, and I am very thankful I am a distance runner and not a 400-meter runner.

Aerobic exercise is many times more efficient than anaerobic exercise. Anaerobic exercise decreases blood PH. Blood PH should be between 7.46 and 7.78. Hard exercise can decrease that to 6.8-6.9. This level will disrupt your metabolism by inhibiting enzyme activity.

When exercising, we increase our energy usage and, as a result, we increase our oxygen consumption. Under certain conditions, if the work rate is constant, we will see an initial rise in oxygen consumption before it levels off. Once this plateau is reached, then oxygen consumption will remain steady over the remainder of the exercise Cardiac Output and respiratory states increase to accommodate the demands on the body.

A trained athlete could have a resting HR of 50 bpm and an SV of 110ml. Therefore, the average cardiac output for a trained athlete is 110ml x 50bpm = 5500ml per minute. Therefore, we can see that a greater cardiac output maintained with fewer beats is a sign of increased fitness.

It is estimated that a body can tolerate about 15 liters of oxygen debt. So let's take an example. Say a runner can run at a steady state of 3 liters per minute. If we ask him to increase his effort to four liters per minute, then he incurs a debt of 1 liter per minute; he will be able to continue for 15 minutes. If we increase the effort to 2 liters deficit, then he can only continue for 7 ½ minutes. So if I match up two athletes, one whose steady state is 3 liters per minute and one whose steady state is 5 liters per minute, who wins the race?

In the past, coaches had thought, and even today many believe, that interval training will increase your ability to run fast for certain periods of time. There is no evidence that this will make a big difference and has almost no effect on your steady state. Coaches and athletes are in the game for a "season," rather than the longer term, like 3 or 4 years. Thus, they are in a hurry to get to the fastest they can in the shortest amount of time. Most of the time, you end up starting the season the same place you did the year before. As a miler, wouldn't you like to start out 15, 20, 30 seconds faster each year? Sprinters, wouldn't you like to take a second or two off your 200-meter time at the beginning of the next year and go down from there?

Keeping your training pace at just below your maximum steady state at all times is the fastest and most productive way to improve. Speed training, and I should note really should be called sharpening, should be used after you have built up your base and done some preliminary work so as to avoid injuries and not peak too soon.

Another way to think about your longer runs is to run them at about 80-85% effort. So if you run 4 miles in 26 minutes in a race, then you should be training at around 28 minutes. For those who are a bit skeptical about the pace, consider Peter Snell, who in the early 1960's ran a 1:44 800 meters and a 3:54 mile. He weighed around 165 pounds and was able to easily run 22 miles at 6 minute mile pace over a hilly course. This also demonstrates that even people who run short races benefit greatly from 2-hour runs. He consistently beat people who could run the 400 meters 1-2 seconds faster than he could. He was able to utilize his basic speed at the end of races when others were too tired to utilize their great speed.

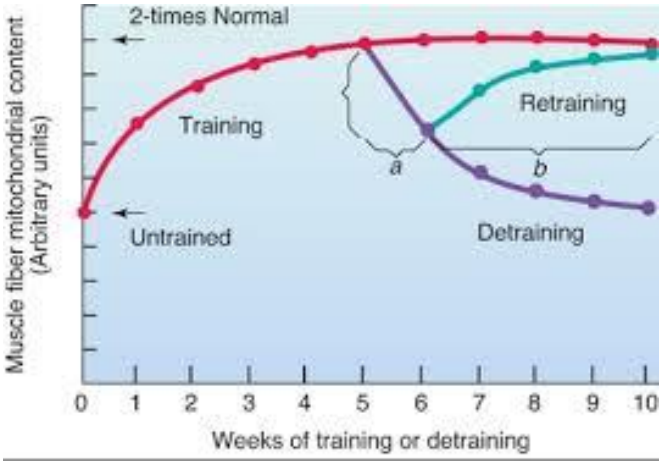
Speed is what stops you from running, not the distance. So slow down, and get the time/distance in. When I was a freshman in high school, my first workout was to jog a mile to the park, run 3 repeat miles, and jog back. I did one repeat in 7:15 and went back to the school. I thought it was all I could do. The next week we had to run 2 miles for the meet, and I was worried about being last. I was not last and finished in 15:38. Four months later I ran a full marathon in 3:37. I had just kept adding on a few miles to my runs every weekend. I did not really think about how long it took me, just finish it. As an additional piece of information, I ran the mile in 4:53 and 2 miles in 10:46 just 8 months after starting cross-country in the fall. No question, the miles I ran between cross-country and track to prepare for the marathon were a huge factor in my improvement.

As your maximum steady state rises, your runs will become progressively faster, and you will be working aerobically where you were running anaerobically earlier.

Hill training is the best method to transition from conditioning training to speed training. Find a hill with a 1 to 3 ratio or similar, not too steep, and do repetitions up the hill. From sprinters to marathoners, this is an excellent way to increase power and flexibility that you will need for sharpening work. The hill work should be springy. It's not how fast you get up the hill -- it's about driving hard up off the toes and with high knees and coming down on the toes, dropping to the heel before driving up again. This works all the muscles necessary for speed, your cardio-respiratory system, and gives you great flexibility in your lower legs and ankles. I recommend jogging back down for recovery.

Some people advocate jogging at the top and bottom, and even adding a few moderate wind sprints in-between.

A famous coach once said that if you train 6 days a week, you are giving your opposition 52 days more training than you. How do you expect to beat them? You should train every day. Even if it is just a little. My philosophy is similar. For every day you miss, it takes two to catch up to where you were when you quit. At that rate, you will never catch up to where you would have been.



Finally, I want to make a comment about the drop in times for all events. Notwithstanding the performance-enhancing drugs that seem to keep cropping up in sports, track has experienced a revolution in surfaces since the 1960's. We had cinder tracks and some grass tracks in most of the world back then. For the most part, in the late 1970's high schools and colleges got the all-weather tracks. Running on all-weather tracks was kind of like running on the street instead of trail running. The Olympics went Tartan in 1968. It's been said that those tracks improved times for the mile by a factor of 1 second per lap. Personal experience bears this out. Today, the tracks are designed to provide just the right amount of "bounce" to propel the athletes forward. So the question could be raised, are the times that much faster than in the 1960's? Let's take the mile as an example. Peter Snell ran his 3:54 on a grass track and Jim Ryun ran his world record virtually solo (he led the whole race) in 3:51. Taking those times on a 1980's track surface would translate to a 3:50 and a 3:47 mile time. The world record is currently 3:43. Just to add a little more to the story, rabbits are currently allowed -- they were not

back then. The person who ran the current world record didn’t even take the lead until the last lap after the rabbits dropped out of the race.

So, how do you start? You should be able to reasonably jog for 15 minutes to start with. Keep doing it even if your muscles are sore. It goes away. Add 5 minutes to every other day after two weeks. Add 5 minutes to the 15-minute days, and 5 to the 20-minute days after that. Continue until you can reasonably run for an hour on most days, and extend two of those days to 90 minutes. Until you get to that amount of time, don’t worry about how far you are going. Try and stay consistent in your pace. Don’t vary the pace widely. The goal is to develop those capillary beds in the lungs and muscles, add red blood cells, increase blood volume, stroke volume, and minute volume.

Good Luck.