

Utilizing Both Time and AT to Become a Better Distance Coach

Coaches always ask what I consider to be the most important component(s) of a successful distance program. I have six that I know are truly important. They are: caring about each particular runner's well being, developing a program for long term success for each runner, emphasizing both form and efficiency, providing a positive learning environment while having fun, utilizing anaerobic threshold and training for time. I have chosen to discuss the last two components as they seem to be the least understood and discussed.

The single most important component to setting up a successful scientific based distance training program is to know each runner's anaerobic threshold or AT. Anaerobic threshold, also known as lactate threshold, is the physiological point during exercise where the body begins to produce lactic acid faster than it can be metabolized or removed. Each athlete has a very specific heart rate(HR) where AT occurs. The only way to truly know how hard your body is working is by utilizing heart rate training. Everything else is guesswork.

There are four energy systems in the body; Aerobic Conditioning or Aerobic Endurance, Anaerobic Conditioning or Anaerobic Endurance, Aerobic Capacity and Anaerobic Capacity. Each of these four systems must be trained specifically to get the maximum result for each runner. The term aerobic means with oxygen while anaerobic means without oxygen. Each of these energy systems has a specific heart rate range for every runner based on their particular AT.

There are several ways to determine each runner's anaerobic threshold. The best is to utilize an OmegaWave machine which will give you the answer in about 3-4 minutes with no effort. The next is a laboratory treadmill VO2 Max test which is used to estimate VO2Max, test lactate in the blood and get max HR. The test is somewhat expensive and will leave the athlete fried. The final is to make an educated guess while each athlete utilizes a HR monitor and runs. You can either stand beside a treadmill as the athlete runs or you can run/bike with each athlete while they run and listen to their breathing when they reach the range where AT usually occurs. We find that most high school boys have an AT that occurs while their HR is between 165-175bpm. High school girls generally have an AT that occurs while their HR is between 168-178bpm. AT usually occurs in that range when the athlete's breathing changes. I must note that there are a few exceptions to this rule of thumb. I must also note that a higher AT has absolutely nothing to do with ability or potential it just tells you where their training needs to be.

Base training is quite simply training the aerobic conditioning/endurance system so that it utilizes oxygen optimally. Training this system is what most cross country runners should be doing during the summer starting at least by July 1st. High school cross country races for both sexes are typically 4K-5K. Scientifically we know that approximately 70-75% of these races are aerobic in nature. So common sense should tell us that we should spend at least that much time training that corresponding system during the competitive season. But as Voltaire said, "Common sense is not that common."

The aerobic conditioning system has a HR range of 30 beats per minute(bpm) and contains two distinctive areas; aerobic maintenance and aerobic development. For this example, a runner's heart rate at AT is 170bpm. Aerobic maintenance, known as recovery runs, occurs when the HR

ranges from 140-155. These runs should be used after illness, all out efforts and when the basal HR (your HR before getting out of bed) has increased 3-5bpm. Aerobic development, referred to as easy runs, occurs when the HR ranges from 155-170. This is the energy system that promotes long term success in distance running by helping prevent both injuries and burnout. It is also important to note that your runners should take at least six minutes at the beginning of their run to reach the bottom number of their aerobic development range. Otherwise they will have to run at a slower pace to keep their HR in the zone. This is similar to the effects of going out too hard in a race, except the runner is usually not aware of it. However, the heart does sense it.

The next HR zone, or training zone, that I consider to be the glue that holds everything together is called anaerobic conditioning or anaerobic endurance. The HR range for the aforementioned athlete to optimally train anaerobic conditioning/endurance is 184-195bpm. Workouts that work best for enhancing the anaerobic conditioning/endurance energy system consist of tempo runs, cruise intervals, steady states and some fartleks. During a 20 minute tempo run it should take 7-8 minutes to reach the bottom of this zone. They should remain in the anaerobic conditioning zone for the remainder of the workout.

It is the 14 beats between these two energy systems that get most runners and coaches in trouble. This is the mixed zone where we find that the runner gets very little benefit or in fact is changing his/her physiology in a negative manner. This zone is where junk mileage really occurs. We find in our testing that most runners are doing their easy runs too fast and their fast runs too slow. Most high school runners are in fact training in this mixed zone while supposedly doing easy aerobic runs. Training incorrectly keeps them from being fresh for their faster workouts causing them to leave their best races in practice instead of producing them at the meet.

The third energy system that we will discuss is aerobic capacity. The HR range for the aforementioned athlete to optimally train aerobic capacity is 201-212bpm. Workouts that work best for enhancing the aerobic capacity energy system consist of interval repeats at 3200 and 5K race pace as well as some fartleks. The optimal length of these interval efforts should be from 2-5 minutes. The athlete should reach this zone at some point in the last half of the workout.

The final energy system is anaerobic capacity. It is primarily utilized to enhance training for distances ranging from 800m – mile during track season. Workouts that enhance this system consist of efforts of 30 sec – 2 minutes in duration. Most coaches would use 200's at 800m pace, 300's at $\frac{3}{4}$ mile pace and 400's at mile race pace in order to work this particular system.

I use this rule of thumb for harder workouts to make sure that I don't over do anything. When in doubt...don't. It is better to have your athlete fresh for a race than frustrated because he/she has over done something in his/her training. The smartest hard workout I ever did in college was when I was doing $\frac{3}{4}$ mile repeats. I knew that it was going to be a bite because my body wasn't happy on the first one. My coach was smart enough to know from how I looked that something wasn't going right in my training and changed the rest of the workout to be an easy three miles at no faster than seven minutes a mile. I thought he was crazy because I had grown up with the football mentality that I just needed to suck it up. The very next week my workouts went to another level because he had not let me go over board in my training.

I have had numerous athletes from high school to professional who had suffered from nagging injuries without explanation. Once we tested their AT, we found that they were, in fact, training too hard on their easy days and their aerobic conditioning system was shot. In order to eliminate the injuries and improve performance, they had to retrain this particular system. Professional athletes that were used to training at six minutes or under per mile on easy runs were now only able to run at about nine minutes per mile in order to train the aerobic conditioning system properly. We found that it usually took them about a year to get back to their previous six minute per mile pace with their heart rate staying below their AT. They ended up happier, healthier and faster with longer careers because they were willing to take the time to correct this training problem.

Any workout can be made to enhance any energy system by utilizing duration, speed and/or recovery between efforts. It is the mixing and matching of these workouts to enhance the four energy systems that will provide optimal race results. This is the foundation for any great distance program. Heart rate monitors not only tell you if you are going too fast on your easy days but they also tell you if you are going too slow or getting too much recovery on your faster days. The heart is the only thing you have that can tell you just how hard you are working. Would you rather use science or guess work when you implement your workouts?

The second component that I believe will benefit all coaches and consequently their athletes regards training utilizing time...not distance. Training for time provides a more organized and safer workout environment. The time you have with your runners is used more efficiently while allowing you to train more effectively. The body does not understand distance...it only understands time!

Most coaches have their distance runners running for a particular distance each day. It doesn't matter whether it is an easy run or intervals. The consequences of this are that the athletes all finish at different times due to ability or training level. The idea should be that every athlete within a group should finish the workout at the same time. Since each athlete is training for the same duration and at their specific HR, they will all get the maximum benefit. All they need to do on easy aerobic conditioning days is to go out for half the time they will be running and then turn around. You will then know exactly when everyone should be done. Everyone in that group running for that time should be finishing at the same time regardless of pace. Training for time promotes the safety of the runner.

During mile repeats, a standard for distance runners, not everyone finishes at the same time. This is especially true at the high school level where there are both sexes as well as many different abilities within the sexes. When the first mile repeat is done your best runner(s) will finish in about five minutes and the slowest somewhere around eight minutes. Your plan would have the recovery time be constant for everyone. This means that from the time your first runners finish you have to keep track of so many different runners that it is virtually impossible to keep track of each runner's pace and recovery. You will get to the point where you have runners finishing when others are taking off. How are you able to communicate with everyone? Isn't your goal to help everyone improve? The bread and butter of most successful high school programs are the developmental runners. They want to know that they have your attention. Training for time allows this subtle interaction to occur.

The perfect place to do faster workouts is an 800-1000 meter loop with slightly undulating or flat terrain. We know that the best interval time for training your aerobic capacity energy system is 2-5 minutes. Since we want to enhance aerobic capacity and provide the same stimulus that a typical mile repeat would provide, we will use the five minute time interval to replicate the training effort needed. I would suggest having the entire group start out going the same direction for the same amount of time. They will all then stop at five minutes each having just spent the same amount of time in a particular energy system if they are at the correct pace. Have them all recover for the same amount of time and then have them come back in reverse. It makes sense that they should all be back to the starting point of the first effort when they finish. Now you have everyone together where you can talk to the team and/or individuals as well as provide them with water.

Several other practice stimulations have just occurred as well. Your lead runners get tired of being the front dog in workouts and chances are they won't be leading every race. Runners that generally finish toward the back now get to see what it is like in the front of the workout. Without any extra effort on your part you have just added the chase factor for your faster runners. They get to catch people now. What an incentive! Your slower runners don't want to be caught either. This experience in practice gives them a unique opportunity to catch the next runner which in turn fosters the belief that it is possible to catch the next runner in the race. Believe it or not it will also help your team camaraderie as now everyone is working together to get better.

I would also have each runner note where they stopped after the first effort and do their best to make it back to the same spot. This keeps the effort consistent and lets you know if they are going out too hard or possibly too easy. Our cross country team utilizes time to replicate 800-1000 meter repeats by doing three minute runs and 80-90 sec runs to replicate 400m workouts.

Running for distance makes it more difficult to increase the workload properly to avoid overuse injuries than if you run for time. The safe amount to increase in a week is right at 10%. So which is easier to find correctly and implement if you are running about seven minute pace for your easier runs...10% of 50 minutes (5 min) or seven miles (.7 miles)? I would also note that there will also be natural increases in the distance run as your runners get in better shape without an added increase in time spent running.

Replicating in practice what you are going to be doing in a meet is one of the most essential psychological benefits of training utilizing time. That is why I feel the warm-up and cool down should always be done for time at both practice and at meets. You might know where a certain distance is in practice but when you get to a cross country meet typically the distances aren't measured or if so they are incorrect. The same holds true for warming up for a track meet. You would have to be able to warm-up in lane one at all your meets in order to know what distance you have run and we know with everything going on at a track meet that you will be unable to do so. Why not warm-up and cool down using the same time period for both practice and meets? This feels right to the athlete at a meet as they have done it many times over when getting ready for their hard efforts in practice.

Now that you have organized your workouts into training blocks of time to get the most benefit with the least amount of effort, you have more free time with fewer headaches and have

alleviated several safety concerns. This leaves you with a little more of that most precious commodity that you have to give to anyone...time.

NOTE: We actually purchased an OmegaWave as I felt that it gave us the safest as well as most efficient and accurate reading for AT. It also indicates an athlete's readiness for his/her next workout. Utilizing heart rate training with knowledge of AT to properly train each energy system has allowed many distance programs to take the next step in building their program. We actually test all coaches and athletes with the OmegaWave that attend our Smarter Training for Faster Running Summer Cross Country/Distance Camp in Colorado each July. We also cover in great detail all six components that I mentioned earlier that I feel are an integral part of any truly successful distance program.