Base AeT Training

In some ways the initial Base period of the year is the most important in the athlete's season. It's during this time of the year when great gains can be made in three of the most important abilities in the athlete's fitness arsenal—**endurance**, **force** and **speed skills**. In no other period of the season is the athlete willing and able to devote large chunks of time to the key systems for these abilities: aerobic, muscular and nervous. Once into the Build, Peak and Race periods the athlete is totally focused on race-specific fitness, which is as it should be.

Unfortunately, many endurance athletes short change their Base period by jumping ahead and making it sort of a mini-Build period by doing anaerobic intervals, fast group workouts and generally race-type workouts. What a shame. Most never realize what they are missing in their seasonal preparation and could be so much more fit if they took advantage of the gains that could be made by developing endurance, force and speed skills.

Aerobic system fitness is perhaps the single best determiner of performance for an endurance athlete. That seems obvious since aerobic system development has a great deal to do with the heart's stroke volume, muscle enzymes which use oxygen to convert fat to energy, blood volume and oxygen transport capabilities, and more. By-passing the full development of this critical system in order to become more anaerobically fit, which is all too common for the Base period, means that the most important system for endurance sports is underdeveloped. This is like having lots of icing but very little cake or building a big house on small and flimsy foundation. Neither is very good.

Over the years my approach to building aerobic fitness has changed. I used to believe that long, slow distance (LSD) was the most important type of training for aerobic system development. But in the last few years experimentation with the athletes I coach has led me to believe this is not enough. By itself LSD will not fully develop the aerobic system. A bit higher intensity is needed. Rather than just noodling along at a relaxed, 1-zone effort I believe that one must challenge the aerobic threshold in training to see complete aerobic development.

The optimal way to train any physiological system is to frequently repeat a stress that precisely targets the system. When it comes to the aerobic system that target is the *aerobic threshold* (AeT). When training at the aerobic threshold all of the key aerobic systems are stressed and the stress can be maintained for relatively long periods of time just as one must be able to do in an endurance race.

So how do you know the level of intensity that targets the AeT? There are several ways depending on what technology you have available. Perhaps the

most common these days and the easiest to use is heart rate. Your pulse during exercise has always been a good indicator of how the body is relating to the stress being applied by running, cycling, swimming, cross-country skiing or whatever it is you do. Most athletes wear a heart rate monitor (HRM) for this reason. Most also know the heart rate which represents their *anaerobic threshold* (AnT), also sometimes called the *lactate threshold* (LT).

I've found that there is a pretty good correlation between AeT and AnT, meaning that if you know one you can predict the other fairly closely. They are about 20 bpm apart. So, for example, if a generally fit endurance-trained athlete knows his or her AnT to be 160 for a given sport then the AeT for that same sport is approximately 140. (Realize that AeT and AnT vary by sport *within the same athlete*.) This makes training at AeT a rather simple matter—just wear a HRM and exercise steadily for long periods at 20 bpm less than AnT. (If you don't know AnT you can get a good approximation by conducting an all-out, race-effort, 30-minute time trial and using your HRM split function to find your average heart rate for the last 20 minutes of the effort.)

That sounds easy enough. But how long should the workout effort be? I make this decision based on the type of events for which the athlete trains, but for cycling I use two to four hours of steady AeT exercise as the common range regardless of the event. If your race duration typically falls into the two- to four-hour range simply train for that duration at AeT. For example, if you do the bike portion of a half-iron-distance triathlon or bike road race with typical time of around 2.5 hours, then do 2.5-hour AeT bike rides (not including warm-up). Should your race times be less than two hours (criterium bike racing or Olympic-distance triathlon bike portions) then your AeT bike workout will be two hours. If your event takes longer than four hours (ironman-distance bike and long road races) your AeT bike workout will be four hours duration. AeT workouts of this duration are done once or twice weekly per sport in the Base period. That's all there is to it.

Actually, there's a bit more. As with any training you need to know if you're making progress and when you've done enough of such training to consider moving on to the Build period. This can be done by comparing heart rate to another metric (power and pace are the best) and measuring cardiac drift relative to that metric. In an aerobically fit athlete cardiac drift will be minimal. Here's how I do this.

On a bike with a powermeter I have an athlete complete an AeT ride and after the ride upload the powermeter's heart rate and power file to *Cycling Peaks*, an excellent analysis software available through www.TrainingPeaks.com. The AeT portion of the ride is then separated into its two halves. For each half the average power is divided by the average heart rate. The results are then compared by subtracting the first half quotient from the second half quotient and dividing by the first half quotient. This creates a Pw:HR ratio percentage of change—a measure

of cardiac drift (actually, a measure of power changes relative to a steady heart rate which is wanting to rise). When the athlete's Pw:HR shift is less than 5% I consider AeT fully developed and the aerobic endurance goal of the Base period accomplished.

With the development of GPS and accelerometers this same procedure may be used for pace-based sports such as running and cross-country skiing. Simply substitute pace (Pa) for Pw in the procedure above. For runners I use AeT workout durations that are one to two hours long. (*Cycling Peaks* software will soon support GPS devices, also.)

Essentially, when an athlete is in good aerobic condition his or her heart rate and power or pace will stay closely coupled at aerobic efforts as described above. If power or pace drops off relative to heart rate, or if heart rate rises relative to steady power (65% of CP30 power is a good approximation of AeT power) or pace the athlete is said to be aerobically *decoupling*. If this is greater than a 5% shift then more aerobic training is necessary. In fact, these AeT "tests" are the perfect workout for developing aerobic fitness—just do one or two of these workouts weekly by sport.

Even if you don't have a powermeter, GPS or accelerometer you can still do the workouts using your trusty HRM. In this situation you will have to base decisions about your aerobic endurance fitness strictly on perceived exertion: Over time do you seem to be going faster at AeT?

I have found AeT workouts to be one of the most effective ways of training I have ever found for endurance athletes in the Base period. Give it a try and let me know what you think.

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