TRAINING PRINCIPLES FOR SUCCESSFUL DISTANCE RUNNING

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The author presents some excellent guidelines to help the coach better quantify distance training. This article will help to take the guesswork out of prescribing training pace and monitoring the athlete's training.

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"Successful running requires a good training program. No single program is the perfect way to train: You can use many different routes to the same goal. However, every successful training program follows certain basic principles and shares common characteristics with the other successful training programs. . ." states 1964 Olympic 5000m bronze medalist and head track coach at the University of Oregon Bill Dellinger (2). The "Oregon System" is known for its five basic principles of training and its orientation to date pace and goal pace running. Arthur Lydiard, the famous distance running coach from New Zealand, also espoused five important points when training middle and long distance runners (3). As one examines successful running programs, as Mr. Dellinger stated, it quickly becomes evident that there are more similarities than differences.

Programs that consistently develop athletes to their potential do the following:

1. Evaluate each individual athlete's current ability level and review the athlete's past history of training and performance.

2. The new training program is designed around the runner's present ability level, a realistic goal for the upcoming season and the athlete's personal responsibilities.

3. Workloads within the training cycle are varied for each individual. The amount of variation in workloads differs for each athlete depending on his or her ability to recover and adapt to the stress of training. Improvement and progression will only occur as the runner continues to adapt to the stresses of training.

Exercise physiologist Dr. David L. Costill has devised a method for quantitatively monitoring a runner's training program based on his or her current VO_2 max. VO_2 max (maximum oxygen uptake) is the maximal amount of oxygen that can be consumed by the body. Most exercise physiologists consider VO_2 max the best single indicator of endurance potential (1).

To determine the runner's current VO_2 max we need the runner's present best time for one or two miles or 10,000 meters. With one or more of these times one can estimate fairly accurately the athlete's current VO_2 max. Here are the formulas for determining VO_2 max:

For One Mile VO_2 max 133.61—(13.89 x mile time in total minutes)

For Two Miles VO_2 max = 128.81—(5.95 x two mile time in total minutes)

For 10,000m VO_2 max = 120.8—(1.54 x 10,000m time in total minutes)

"The relative intensity of the training run can be calculated as the percentage of VO_2 max used during the run," states Costill (1). The percentage of maximal oxygen uptake (%VO_2 max) used while training can be calculated with the following equation (1):

VO_2 = (329/Pace in minutes per mile)—5.24
%VO_2 max = (VO_2/VO_2max) x 100

"To rate the pace or intensity of the workout, the percent of VO_2 max is divided by 70%, an effort known to be neither hard nor easy for the athlete" (1).

$\%VO_2$ max/70% = Intensity Rating

A rating of 1.0 is considered a moderate training pace equal to 70% of the runner's VO_2 max. The higher one goes above 1.0 the faster the training pace and closer to VO_2 max. A rating of 1.43 is training at a pace equal to the runner's VO_2 max. This is an intensity rating that can be tolerated only once or twice a week by most athletes.

To evaluate the distance run in a given workout divide the distance run by the average daily mileage for the past three weeks. For example, if an athlete was running 35 miles a week for the past three weeks his daily average would be 5 miles. If he went out for a 7-mile training run the distance rating would be equal to 1.4 (1).

DR=Training Miles Run/Average Daily Mileage
DR=7/5=1.4

"The distance rating and the intensity rating help to estimate the demands of training" (1). By using both factors one can estimate the demands of training. The overall rating for the workout is obtained by averaging the two ratios, intensity and distance ratings, together to obtain one overall rating.

Overall Rating = (DR+IR)/2 x 100

According to Costill, "Workouts that receive an overall rating above 105 are usually quite stressful, indicating a need for lighter training the following day. A workout rated at 100 or less is tolerated well by the runner and can be repeated for several days"(1). While this approach to monitoring the runner's workout may appear complicated and time consuming, it does provide the coach with a single index indicator of the physiological demands of training.

To insure the athlete's progress and to monitor for signs of overtraining, several methods of evaluation are readily available:

1. Resting pulse rate upon waking. If the resting pulse remains the same or drops training is going well. A morning pulse rate 10% or higher than average is a signal that the athlete has not fully recovered.

2. If the athlete's weight in the morning, before breakfast, is 2 or more pounds below normal, compared to the previous morning, he or she is still dehydrated from the previous workout.

3. Disrupted sleep patterns. Waking several times during the night is a sign of distress and overtraining.

4. Talk with the athlete daily. Ask him how he feels.

5. Have the athlete run a mile at sub-maximal pace each week or two. The mile must be run at the same prescribed pace every week. Upon finishing the run take the runner's pulse. If training is going well this pulse rate should drop over time. If the pulse is elevated above the previous efforts this could be a sign of overtraining (1).

FIVE PRINCIPLES OF TRAINING FOR IMPROVEMENT AND PROGRESSION

1. Physical performance improves as the body adapts to the training stimulus (2).

2. The physical workload and rate of adaptation to that training regimen is different for each individual (2).

3. When the training stimulus is inadequate, too large or too small, the rate of adaptation to that stress is slower and less than optimal (1).

4. The S.A.I.D. Principle. Specific Adaptations to Imposed Demands states that physiological adaptations are specific to the method and mode of training (1). There is little crossover training effect.

5. The human body adapts slowly and therefore responds optimally to small gradual increases in training stress. Periods of greater workload should be followed by periods of reduced workload (1).

REFERENCES

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