DEVELOPMENT OF SPECIFIC SPEED CAPACITY IN ENDURANCE DISCIPLINES

Professor Peter Bonov, Ph.D. D. Sc.

The level of speed capacity and its realization is of crucial importance for the achievement of success in disciplines requiring endurance.

A few days ago we had a serious debate at the Olympic Committee of the Bulgarian Ministry of Sport. It started while discussing the training program of , the best Bulgarian athletes in modern pentathlon. The methodology and peculiarities in developing his speed capacity was at the root of our debate. This capacity was taken as the basis for improvement of his achievements in cross-country running and swimming. The prevailing opinion was that speed training in endurance disciplines like running and swimming is rather different from the classical one, i.e. it is strictly specific.

It ought to be developed in correspondence with the **bio-energetic**, **motor-muscle characteristics** and **psychological peculiarities** of the respective disciplines.

Bio-energy in endurance disciplines is complex, i.e. energy provision is both aerobic and anaerobic. Consequently, training for increasing the energy potential of an athlete is a combination of aerobic and anaerobic training and the peculiarities of speed training should be analyzed on this ground.

Muscle effort (the motor factor) is determined basically by the structure of motion in competition, i.e. its dynamics and kinematics. So in middle and long distance running the length (amplitude) and speed of the running stride determine the actual level of performance of speed capacity. Amplitude is determined basically by the strength characteristics of muscle activity. Frequency depends on the reaction capacity of muscles, i.e. on their ability to transform impulses coming from the central nervous system into a number of movements. Consequently, training for development of speed capacity is

focused on improving the parameters of the running cycle at a corresponding speed level of running.

Psychological characteristics are determined by the ability of the central nervous system to maintain a high level of impulses for a long time. This implies preserving the level of toleration of human body with constantly increasing fatigue, typical for endurance disciplines.

On these grounds a training complex for the development of speed capacity of an athlete, preparing for an endurance competition ought to have the following elements:

- **Training for the improvement of the qualities of neuro-muscle innervation.**

  Muscle activity is directed and controlled by the different levels of human nervous system. The basic problem is choosing the best training means for an effective improvement of muscle abilities to react adequately to coming impulses.

- **Training for the improvement of neuro-muscle coordination.**

  Irrespective of the intensity and strength of impulses reaching the muscles, muscle ability to transform them into mechanical movement depends on the interaction of a great number of motor muscle units and the right sequence of straining and relaxing, i.e. internal muscle coordination. This can be achieved at the application of special exercises, leading to the improvement of this mechanism.

- **Training for the improvement of acceleration – increasing motion and speed.**

  The capacity of increasing running speed – acceleration is an extremely important factor in various stages during a competition. A good example here is changing tempos during a competition, which is typical for the endurance competition tactics. The basic means to solve the problem here is training at a progressive increase of speed, reaching the highest speed at the final stage of the running distance.

- **Training for the improvement of specific strength capacity**.

Improvement of speed capacity is determined to a great extent by the specific strength level. The shorter the effort in competition is, the greater the importance of absolute strength capacity and vice versa, .the longer the effort, the greater the importance of relative strength capacity. It is well known at the same time, that the greater the strength effort is, the longer it lasts. This is a fact proving the importance of speed-strength exercises for the development of specific strength of endurance athletes and for the increase of their speed capacity.

- **Training for improving speed capacity at the progressive increase of fatigue.**

  This type of training is among the most important, since it is directly connected with the ability to reach high speed in the final stages of various competitions. This ability is greatly determined by the threshold level speed of anaerobic exchange on the one hand, and by the athlete‘s body toleration to high acidosis level, typical for the final stages of each competition, on the other.

- **Training for improvement of the capacity to change speed parameters and tempo in various circumstances during a competition.**

  In continuous running competitions it is often necessary to quickly change tempo, even more than once. This is connected with changes in the dynamic and kinematics parameters of movement, for example, shortening and increasing the number of running strides or widening the length of the stride while keeping the same frequency, etc.

Speed training in the preparation of athletes in endurance disciplines is a combination of the types of training mentioned above. It is complex training, which is done throughout the year, i.e. all above-mentioned training methods are used systematically while preparing the athletes in the different types of endurance. However, its content can vary according to the requirement that training methods provide the highest level of specific speed capacity in the time of competition. This requirement presupposes a definite sequence of methods in the macrostructure of the training process.

In the general preparation mesocycles basic speed work is dominated by the task of improving the specific strength abilities in neuro-muscle innervations and coordination.

In the specific preparation mesocycles speed training is primarily directed to the development of specific speed capacity, the ability to change tempo in the different stages of the competition and the ability to accelerate in the final stages of the running distance.

The basic training means used to resolve the tasks of improving the above mentioned components of speed training in endurance disciplines are the following:

Exercises for development and improvement of neuro-muscle innervation and coordination. Running exercises are a good example here. Their amplitude is artificially decreased and the basic requirement is maintaining high frequency.

Exercises for development and improvement of acceleration abilities. Accelerating running exercises belong in this group and the requirement is a constant increase of running speed - for example, running following preliminary marking. Other exercises of the same type are starting runs, performed from various starting positions.

Exercises aiming at improving the abilities to change speed by changing the correlation between length and frequency of the running stride. Fartlek and cross-country running are typical exercises in this respect. Using specially designed exercises with dramatic changes of the above mentioned parameters is also an effective device.

Exercises improving the ability to increase speed in the final running stages are directly connected with increasing the economy capacity in using the energy resources of human body – increasing the running speed level at which the process of intensive lactate accumulation in the body begins – the aerobic threshold level. This phenomenon to a great extent determines an athlete's ability to realize his/her speed capacity in the final stages of the running distance. The task of developing and improving the athlete's indexes this

phenomenon is a permanent one in the training process of all endurance disciplines.

These are the basic principles around which modern systems are created for the development of specific speed capacity in disciplines requiring endurance.