TRAINING PROCEDURES IN SPRINTING

By Valeri Borzov

Munich Olympics double gold medalist, Valeri Borzov, discusses the principles employed by his coach, Valentin Petrovski, in sprint training. The article is based on translated extracts from Borzov's recent book, titled "10 Seconds — a Lifetime", serialized in Kehakultuur No's 4 and 5, 1983, published by Penioodika, Tallinn, Estonia.

Valentin Petrovski, who coached me, believed that the first task before the start of the season faced by the coach and the athlete is to decide how to reach in eight or nine months time at a fixed date of a major competition a performance that exceeds previous season's results. Naturally, something had to be changed in the condition of the athlete; otherwise there would be no improvement. However, what has to be changed and how much?

A simple solution in this situation is to increase the load in all training phases, hoping that the improved level of performance capacities will automatically assure better results. This approach can be dangerous. Results in sprinting (also in other events) do not depend on one performance factor only, for example, speed, but a variety of factors: speed, speed endurance, power etc. Further complications are added by the possibility that an overdevelopment of one factor can often be responsible for a drop in another performance area. For example, an improvement in speed endurance can take place at the cost of a drop in pure speed. Consequently, all performance factors have to be developed in an optimal relationship to each other.

Petrovski was a biologist and looked upon all changes in the training process as corresponding functional changes in the organism. This meant that in order to achieve better performances all the sub-systems of the organism — neuro-muscular, cardio-vascular, ventilation etc. — had to be developed to reach new, correctly planned levels....

Petrovski, after evaluating my 1968 preparations, compared this information with the world's best sprinters. It revealed that, while I had recorded 10.2 sec. for the l00m, my maximum speed and the acceleration ability were below the world's best. The comparison made my task clear, I had to improve my start, the acceleration phase and lift the maximum speed level. What was left to decide was to clarify to what level these parameters had to be improved in the training process and what changes had to occur in the performance indicators.

The following indicators were selected for the evaluation: 30m from a flying start to evaluate maximum speed, 30m and 60m from a crouch start to evaluate the efficiency of the start and the rate of acceleration. The times of l00m and 200m were used to evaluate speed endurance. Assuming that sprint times depend mainly on the start, the acceleration, maximum speed and speed endurance, all that was left was to decide how these indicators had to correlate with concrete 100 and 200m times.

Petrovski had for this task established a table of evaluation indicators, based on the performances recorded by Soviet, as well as foreign sprinters. The table, slightly changed according to practical experience, still serves a useful purpose today (see table 1).

I will use some examples to show how to use Petrovski's table. Let us assume that I clocked 3.5 sec. in the 30m test from a crouch start and 6.5 sec. in the 60m from a crouch start. At the same time my competitive 100m performance was 10.4 sec. These results, as my 30m time from a flying start was equivalent to 11.5m/sec., indicate that I lacked speed endurance. However, if for example, I would have clocked 10.2 sec. in a 100m race but only 6.8 sec. for the 60m crouch-start test, the results would show a poor acceleration phase but excellent speed endurance.

In 1968 my performance indicators were as follows: 30m from a flying start — 2.7 sec., 30m from a crouch start — 3.7 sec. and 60m from a crouch start — 6.6 sec. Petrovski had planned for me to reach 10.0 sec. in the following year to compete successfully in the European championships. This meant that I had to reach in my preparation the following indicators: 30m from a flying start — 2.6 sec., 30m from a crouch start — 3.6 sec., 60m from a crouch start — 6.5 sec. We concentrated on the 100m because there wasn't sufficient time to lift speed endurance to a level required to contest successfully the 200m event.

As it can be seen, I had to improve all my performance indicators by a margin of 0.1 sec. This meant a full year of well planned work besides finding ways and means to employ the most efficient training methods. We had to discover an approach to training that would make it possible to break the so called "speed barriers" and Petrovski found the answer.

Petrovski's search for an answer was based on the understanding that a certain performance in the 100m requires a corresponding level of maximum speed and speed endurance. Under maximum speed we understand the fastest a sprinter is capable of over a short section of the whole distance. Speed endurance is the capacity to maintain a certain speed in a time unit or over a distance. Naturally, different 100m performance require different levels of maximum speed and speed endurance.

To lift the required capacities to certain levels can be achieved by using different type of repetitions over 30 to 400m distances. However, it is known that the effectiveness of training depends not only on the choice of methods used, but also how these methods are employed. Let us assume that I am working on the development of speed. After the warm-up, I will run the first repetition over 60m. How long should it be before I start the second repetition? What should be the recovery time that would produce best dividends for the development of maximum speed?

Scientific research has indicated that fatigue after any type of workload brings about several changes in the work capacity of the organism. It has been established that there are four recovery stages in this situation and the improvement, or otherwise, of the functional capacities of the organism depends in which recovery stage is the new workload introduced. Petrovski used this information to establish three different combinations of load and recovery relations — methods A, B and C.

TABLE 1					
Speed	Flying		Crouch start		
(m/sec)	30m	30m	60m	100m	200m
12.0	2.5	3.5	6.4	9.9	20.2
11.5	2.6	3.6	6.5	10.1	20.6
11.1	2.7	3.7	6.6	10.3	21.0
10.7	2.8	3.8	6.8	10.6	21.6
10.3	2.9	3.9	6.9	10.8	22.0
10.0	3.0	4.0	7.0	11.0	22.4

In *method A* each repetition is performed in the first recovery stage, i.e. after a short time unit when the organism is still in the low phase of work capacity. This method is used to develop speed endurance. The maximum speed level remains unchanged, or in some cases (when this method is used for a long time) even drops.

In using *method B* each repetition is performed in the second recovery stage when endurance, compared with the initial level, is lower but muscular power, speed and movement co-ordination are at a higher level. This method brings

about an efficient development of maximum speed. Speed endurance remains unchanged or improves a little.

In *method C* each repetition is performed in the third recovery phase when work capacity indicators have reached their initial level. This method has a limited training effect but can be used to maintain form. It has little influence on the development of maximum speed and none on the development of endurance.

The methods established by Petrovski made it possible for us to find an optimal approach to training and adjust the work in any required direction. Consequently, if my performance indicators showed the need to develop maximum speed, I adopted method B and covered 60m repetitions with a minute or minute and a half recoveries. When the aim was to develop speed endurance the recoveries were reduced to 45 sec.

I would like here to give credit to Petrovski, who understood my condition in each training phase, realizing when to increase training loads and when to employ tapering in order to recover before the introduction of the next load. His excellent intuition was, of course, based on his wide knowledge in biology, psychology and physiology, reflected in a precise tuning of my body for important competitions.

My last two weeks prior to competitions were always carefully planned. The training load was exactly established and the recovery organized, using massage, vitamins intake and active rest. I faced competitions knowing my improved performance capacity and mentally rested, in other words — completely prepared for the race. It should be added that Petrovski never set “win or die” tasks. Instead, when he believed that I was ready for a 10.4 sec. l00m clocking, the task was to reach a time in the 10.4 to 10.5 region. This protected me from negative emotions (there was nothing lost if I failed to win, provided my performance was close to the estimated time) and reinforced my belief in the skills and foresight of the coach…

To develop my general endurance and leg power Petrovski made good use in the winter of the 76 steps of the Kiev Stadium. The most difficult exercise he employed was bounding up the stairs with a high knee lift to the chest. It was repeated until complete fatigue and had to be executed with a correct technique.

This, however, was not the end of a training session. What followed were some fairly fast varied speed repetitions over 400 to 800m distances. Why? Because, on one hand, this work helped to improve my lagging endurance and, on the other hand, it also assisted in the development of an economical movement structure. The tired muscles simply had no choice but to work in the most economical movement pattern.

Sometimes the upstairs bounding was replaced by different type of jumping exercises but the running of 400 to 800m distances always followed. I performed this training once a week during the preparation phase, usually on Fridays.

A lot of barbell work was also included in my training to develop strength and specific power. At the start of the preparation phase the barbell was used to increase my muscle mass. In the spring the exercises were changed to develop muscle groups directly involved in sprinting. During the preparation phase I worked with heavy weights (up to 100kg) until fatigued. In the spring the weights were reduced and the exercises were performed against the clock (for example, the number of squats executed in 10 sec.). Jumping exercises, again against the clock, were used to develop leg power. All this lifted my standing triple jump test results over 10 meters…

One of the problems the sprinter is facing after several years of training is the development of a movement stereotype. It doesn't matter how intensive and many-sided the training routines employed, a distinct rhythmical structure of the running stride will be formed. This stereotype, once firmly established, is known as the speed barrier.

Several training methods and specific exercises, including the use of mechanical assistance, are recommended to overcome the speed barrier. I fought the barrier by employing downhill running on a slightly declined track. It helped to eliminate the already existing habits and apparently assisted in the development of new rhythmic structures.