

STUDY REGARDING THE DEVELOPMENT STRATEGIES FOR STRENGTH AND SPEED WITHIN THE TRAINING OF THE MIDDLE DISTANCE AND LONG DISTANCE MALE RUNNERS

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Abstract

Obtaining top athletic performance under the form of a valuable result is the consequence of applying all the factors, "the forces engaged in top professional athletic activity" (Schnabel, 1998), referring to action, to everything generally represented by skills, abilities, knowledge (training), level of regulation and self-regulation of the motor behavior according to the situation, getting top athletic performance through submission to an intense physical and psychological effort. In this context, actual top performance is obtained as a result of a complete perfection. The middle distance running professional literature discusses various aspects of the training process and competition mainly through the prism of volume and intensity, according to the running distance. This study tries to present some strategies for developing strength and speed that are used by great athletes, record breakers in the middle distance events.

Key words: training, planning, effort

INTRODUCTION

The accentuated tendency to achieve notable athletic results in the middle distance and long distance events determined a practical change, especially in regards to training and participation in competitions. An important role in the training process is played by the application of and respect for the methodical, physiological and biochemical principles that allow *the exact planning, scheduling, and measurement of the training effort* during training, and more important, allow one to *establish the effectiveness of the workout that influences top performance.*

The effectiveness of the training depends primarily on the *optimal relation between volume, intensity, and difficulty*, a relation that determines the quality of the training process. The key to top performances is to optimally correlate the three parameters, and not increasing them separately, mechanically. Training must be understood as a system with hierarchies in which the intervention upon one of the systems leads to the modification of all relations between them, and as a consequence, to the modification of how the system as whole functions. The training contents represent those structural elements that, based on certain functional and methodological rules, make top performance possible. The professional literature shows that a large portion of the endurance running is conditioned by the following factors:

- *The morphological (somatic) structure:* height, weight, nutrition index, and age (PRADET, T. 2000, ISRAEL, S. 1995, DRÁGAN, I. 1994).

- *The motor and physical training level,* expressed in numbers - control challenges and standards (TIHANZ, J. 1983).
- *The technical training level,* which for the middle distance running events is not that important, if one refers to energy consumption.
- *The tactical training level,* which is important but only when the specialized training constitutes the basis for the various tactics that are applied (PRADET, T. 2000).
- *The mental endurance* necessary to complete a large number of training sessions, as well as for competing (ISRAEL, S. 1995).

According to F.P. Suslov (1994):

- *Genetic endowment and morpho-functional indices:* the morphological type, the muscle fiber-fat fiber ratio, muscle composition - the fast fiber-slow fiber ratio, the morpho-functional indices of the heart (absolute and relative volume, diameter of the aorta, etc.)
- *Physical training level.*
- *Psychological training level.*
- *Effectiveness of the running technique and the tactical training level.*

AIM, HYPOTHESIS, AND RESEARCH METHODS

Considering all of the aspects mentioned above, this study aimed mainly to highlight the main international methodical and methodological orientations in the speed-strength training for the middle distance and long distance runners.

The starting hypothesis was the following:

The centralization of the main international methodical and methodological orientations in the speed-strength training for the middle distance and long distance runners could be an important indicator in the elaboration of training plans.

This study used the documentation method, and the mathematical method for analyzing the data.

DEVELOPMENT OF THE RESEARCH

Within the contents of the training of middle distance-long distance runners, new elements appeared regarding the restructuring of training efforts during the annual cycle. In order to achieve the goals of the planning, one needs to choose concrete training means, effectively administered, specific to the nature of the middle distance-long distance running effort.

The strength and speed drills are part of the group of alactacid anaerobic efforts, where the energy support is represented by the ATP (adenosine triphosphate) available in muscles, but consumed within 20 seconds (*Drăgan, I., 1994*).

Considering all of these, one needs to specify the role and the importance of strength and speed developing drills within the training of middle distance-long distance runners.

Therefore, the following question is justified: How important is speed for the middle distance - long distance running events? The answer is given by the runners' performances!

Speed is crucial for the middle distance events.

Considering it as important as endurance is not a mistake, however as the running distance increases, the importance of speed in regards to the final result decreases. Speed is important for endurance because it allows the athlete to cover the whole distance with a high speed on average. The tendency to increase the speed across the competition distance can be observed from the data in Table 1, which presents the speed, measured in meters per second, from the best running results in 1994, compared to the ones in 2012.

Table 1. World records from 1994 and 2012, and the running speed over the competition distance, calculated in meters/seconds (Males)

Distance	Time Year 1994	Speed m/sec.	Time Year 2012	Speed m/sec.	Diff. m/sec.
100 m	9"86	10.14	9"58	10.43	0.29
200 m	19"72	10.14	19"19	10.42	0.28
400 m	43"26	9.25	43"18	9.26	0.01
800 m	1:41.73	7.86	1:41.01	7.92	0.06
1000 m	2:12.18	7.57	2:11.96	7.58	0.01
1500 m	3:28.86	7.18	3:26.00	7.28	0.10
2000 m	4:52.6	6.84	4:44.79	7.02	0.18
3000 m	7:28.96	6.68	7:20.67	6.80	0.12
5000 m	12:58.46	6.42	12:37.35	6.78	0.36
10000 m	26:58.38	6.18	26:17.53	6.33	0.15
Marathon	2h06:50	5.54	2h03:38	5.85	0.31

In regards to middle distance-long distance running events, according to *Ardelean, T., Alexandrescu, D., Tatus T. (1983)*, three aspects of speed are important:

The absolute speed, which is not that important for long endurance efforts. It does however have some favorable effects on the behavior of middle distance runners who also compete in the 400m event. It is also true that this aspect of the speed favors especially the fundamental speed.

The fundamental speed is based on the absolute speed, implying also a certain degree of endurance. According to the distance of the race, the fundamental speed is advantageous for the 800-1500m runs, but as the distance increases, its role is

diminished. The fundamental speed is manifested toward the end of a race, because in conditions of equality, the ranking in a race is decided in favor of the runners possessing a higher level of this type of speed.

The relative speed is important for all runners. Associated with the endurance, the relative speed leads to superior performances, allowing, at the same time, a varied application of various racing tactics. The relative speed is emphasized through the results recorded by athletes running on distances that are inferior to the event they specialized in: for the 1500m event we have the 800m result, for the 800m event - the 400m result. Also it has been observed that runners who record better results on shorter distances, farther from their

specialization, can be faster; for example the results of the 800m runners during the 200m event, or even during the 100m event.

The most used training methods proved to be:

The interval training

The interval training uses running portions according to the distance of the event (e.g. 200-400m for the middle distance runners), with a rest interval of 60-90 sec. It is very important for the athlete to run with a corresponding speed in these portions so that at the end of the covered distance, his pulse would not be over 180 beats/minute, and the rest interval must last until his pulse reaches 130 beats/minute. This ensures a constancy of a maximum heart rate (beats/minute) over the entire course of the training, ensuring a good development of the heart and aerobic capacity. The rest can be passive or take the form of light running.

The repetition method. It is considered to be the basic means for the competition period. During the training period, the coaches use long repetitions of 2000 and 1000m. During the pre-competition period, they use medium repetitions (600-400m), while during the competition period, the coaches use short and medium repetitions (300-200 m), at an intensity of 85-95%.

When it comes to junior athletes, it is important that the coach focuses on speed development during their basic training. The program must comprise:

- *drills that train the most effective possible running technique, especially for the middle distance runners;*
- *runs with intensities of 95-100% on distances of 20-25m, with a cool-down period of 3-4 min.;*
- *standing starts for distances of 15-30 m;*
- *runs with tempo changes;*
- *gesture frequency drills.*

But the most important thing is the possibility to assess (quantify) the effect of the drills and to make sure that they are within the desired effort threshold. Every middle distance-long distance runner or coach must have simple devices that show the heart rate and running distances.

In regards to **strength**, it is considered to be "*a combined manifestation of the action of internal and external forces*" (D. Harre, 1976) or "*the skill that allows man to conquer an opposition or to oppose it through an intense muscular effort*" (R. Manno 1996).

In general terms, we are talking about:

The general strength, referring to the degree of development of the entire muscular system.

The special strength, which is manifested during specific motor acts, during which a low number of muscle groups are activated, but performing certain actions or movements that are specific to certain technical procedures.

For the middle distance-long distance runs, the goals of strength training envisage a development of the average muscle endurance, of the long-term muscle endurance. Considering the demands of the middle distance-long distance events, it is difficult to combine strength training with endurance training. The effort in lactacid anaerobic conditions stimulates the hypertrophy of muscle fibers, but this is unfavorable to endurance. The drills most recommended are the ones that develop the slow muscle fibers, which are oxidative and resistant to fatigue.

The recommendations in this case refer to: the use of sub-maximal and small loads within a relatively large number of repetitions, 20-25x. The drills that develop the specific strength are found in the training plans 1-2 times a week (with loads of 30% -50% - 70%).

The magazine *Sport de performanță no. 359-361* presents the means that A. Juantorena and Hichem El Guerrouj used to develop their strength, and also the main strength development method used in the Chinese junior athletes' training. **A. Juantorena** (1:43.50/800m) focused a great deal on strength training. During the training period, his weekly schedule comprised:

- *2 training sessions with a barbell (a volume of 15 tons/session);*
- *2 training sessions on a sand beach;*
- *2 training sessions on a soft, golf terrain, with a varied relief.*
- *Hichem El Guerrouj's strength training is based on the following:*
- *barbell drills, with reduced loads (up to 30 kg), genuflexions and squatting;*
- *drills using various devices for the development of hip, abdomen, and back muscles;*
- *medicine ball drills.*

In China, the main method for developing the strength in juniors' training is the circuit, with the following means:

- *jumped steps performed with or without light loads (sandbags, vests with weights);*
- *jumping forward, with both legs (little frogs);*
- *lunges, jumping from one leg on the other;*
- *hurdling;*
- *jumping combinations;*
- *medicine ball drills;*
- *special running drills performed in a slope, etc. (the variety of drills reaches 80)*

Dosage: 6-8 drills., 3-8 series/training, 2-3 times/week.

CONCLUSIONS

During running on medium, long and very long distances one can observe a clear tendency of increasing the training effort intensity, mainly because the coach uses special strength means and

some efforts directed toward increasing the athlete's speed that would correspond to the aerobic and anaerobic thresholds.

The aerobic threshold speed is the most economic speed that increases the use of fats in the energy production of the body.

The anaerobic threshold speed contributes to maintaining a high ATP and creatine phosphate concentration in the cells and is the best indicator for the muscle adaptation to the endurance effort.

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