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ASPECTS REGARDING THE DIRECTING OF THE COMPETITIVE EFFORT IN MOUNTAIN RUNNING, WOMEN SENIOR

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Abstract: *The research is based on the use of specific training macrocycles, validated through the control samples adapted to obtain the optimum model of preparation and competition for senior mountain running athletes. The purpose of the research is constituted by a particular method of directing and perfecting the training in order to obtain the sports form and the objective results. The control samples were applied at the beginning and the end of the experimental period, in order to record the progress made in preparation by the mountain running athletes, from the experimental group. The research aims to contribute to the development of a specific training methodology for the mountain running discipline.*

Key words: *mountain running, orientation and steering, sports form, training efforts.*

1. Introduction

In Romania, the mountain running as an amateur sport officially started in 2006, in the city of Zărnesti, Brașov county. The first edition of the Piatra Craiului Marathon was organized by Lucian Clinciu, coach at Sports Club Predeal, at the ski mountaineering section. The running race supposed to cover a distance around 40km, crossing the southern part of the mountain and accumulating a positive climbing around + 2200m. The initial times realized during the competition were 4h 34 minutes for the men and 6h 58 minutes for the women. Thirteen years later, the men's record belongs to Mitrică Leonard, legitimized at the Steaua Bucharest Sports Club, 3 hours and 40 minutes made in 2018, and for the women, the record belongs to the local citizen, Iulia Găinariu, with a time of 4 hours and 21 minutes. [6]

In Piatra Arsă, Bucegi mountains, on 9.08.2008, took place the first mountain running National Championship, organized by the Romanian Athletics Federation.

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Fig. 1. *The Piatra Craiului Marathon profile registered with a Garmin device*

At this national championships, athletes from all athletic disciplines had the right to participate, provided they were legitimized at a sports club affiliated with the Romanian Athletics Federation. The competition took place on four categories, each category with its own distance: 8km men juniors and women seniors, 12km men seniors and 4km women juniors. Although the categories have been preserved so far, their distances have been changed. The only variables existing in these races are the route and the level difference which must measure approximately 1000 m climb, and the maximum variable is ± 200m altitude. [7]

2. Tasks of the Research:

– Analysing the data from the specialized literature with reference to the topic.
– Elaborate the optimum model for trainning and competing in mountain running and also achieve the highest shape at the most important competition.
– Sustain the importance of an efficient orientation of the mountain running specific trainning program, in order to achieve the best shape at the most important competiton

2.1. The Scientific Novelty

The scientific novelty consists in elaborate and applicate a model of mountain running trainning program and participate in competitions with an efficient direction and orientation of the training efforts.

2.2. Research Methodology

The study was applied on specialized women senior mountain runners. Four senior women athletes were involved in the research, all with sports performances in the top of the international skyrunning races.

The study lasted 12 months, the experimental research comprising 2 tests:

a. Initial Tests (I T) performed at the beginning of the experimental period;
b. Final Tests (F T) carried out at the end of the research period

2.3. Control samples used in Research

2.3.1. Short distance running (SDR) - 8km with 700m positive difference.
2.3.2. Long distance running (LDR) - 21km with positive difference of level 1740m.
2.3.3. Vertical running (VR) - 3km with 1000m positive difference.
2.3.4. $VO2_{max}$.

2.4. Description of control samples:

2.4.1. Short Distance Running (SDR)

The short mountain running test is a specific test for mountain running in the World Mountain Running Association (WMRA) circuits, now part of International Association of Athletic Federations (IAAF). The women seniors have a distance of

8km and the accumulated level difference is variable. Only 20% of the total distance of the route can be run on the asphalt. Also, the highest peak is not allowed to exceed 3000m altitude. Because WMRA is very concerned about the safety of the runners, one of the basic rules is that the difficult or very technical sections should be minimal. The route is not allowed to exceed a slope of more than 20% over a distance of 0.5 km, or 100m altitude compared to 500m long. The descent portions should not have dangerous stairs or stones and the start portion must be wide enough so that the participants are not uncomfortable in any way. The entire route must be marked with reflective strips, arrows and markings with the name of the competition, including the remaining distance to the finish. [8]

2.4.2. Long Distance Running (LDR)

The long distance running test was taken from another circuit, which belongs to the International Federation of Skyrunning (ISF). Skyrunning events are not part of the WMRA or the International Association of Athletic Federations (IAAF), so they have different rules than the general athletic rules, with participants' safety risks and on routes that can be dangerous.

The route measured the distance of 21 km and + 1740 m elevation. The running surface can be particularly rough in some areas, involving difficult descents and steep climbs. The maximum altitude reached was 2217 m. The climbs are long and demanding and the descents also.

Fig. 2. *Profile of the long distance running race*

2.4.3. Vertical Running (VR)

Vertical running is also a test in the WMRA circuit. The philosophy of the institution of organizing these races means that each year the race will be different. In odd years there are organized climbs & descents, and in even years are organized only climbing, or climbing in the most part.

The rest of the characteristics of the race are similar to the short sample of mountain running.

However, the control sample used was from the skyrunning circuit, because it was shorter, higher intensity and had a considerable climbing.

2.4.4. $VO2_{max}$

$VO2_{max}$ is a parameter that has been recorded using modern technology. The device for monitoring the stress parameters and the heart rate during the effort has been refined and outperformed in recent years. The monitoring watch used was a Garmin Fenix 3, the newest on the market during the research period, along with the wrist strap. This device can measure all the indicators of the effort in real time, being equipped with GPS, pulse sensors, pressure sensors and automatically calculates the $VO2_{max}$ level.

The accuracy of this device is also certified by studies such as "The exercise profile of a polish representative in mountain running Central European Journal of Sport Sciences and Medicine"; in which it is confirmed that $VO2_{max}$ increases approximately 2-3 ml / kg / min per year.[4]

2.5. Procedure for conducting the research

The research included the following steps:

- The first stage consisted in researching the topic approached from the point of view of the specialized literature and preparing the optimal conditions for conducting the research.
- The initial tests were applied at the beginning of the research period, in order to record the start dates.
- The experimental program contained 2 training macrocycles applied for a 12 months period, a complete competitive year.
- The final test carried out at the end of the experimental period in order to highlight the hypothetical value increase of the indicators obtained in the four initial effort tests.

2.6. Results recorded in the control samples

Table 1

IT and FT results at the SDR test

Athlete	Initial testing	Final test	Difference
No. 1	68’ 50”	67’ 40”	1’ 10”
No. 2	65’ 40”	64’ 40”	1’
No. 3	68’35”	67’ 25”	1’ 10”
No. 4	68’ 10”	66’ 30”	1’ 40”
M_a	67’ 58”	66’ 33”	1’ 15”

Table 2

IT and FT results at the LDR test

Athlete	Initial testing	Final test	The difference
No. 1	103’40”	101’ 23”	2’ 17”
No. 2	92’ 45”	91’ 40”	1.05
No. 3	101’21”	100’ 20”	1.01
No. 4	100’	93’ 30”	6’ 7”
M_a	99’ 26”	96’ 53”	2’ 73”

Table 3

IT and FT results at the VR test

Athlete	Initial testing	Final test	The difference
No. 1	44’	43’ 25”	45”
No. 2	42’ 20”	41’ 10”	1’ 10”
No. 3	43’ 50”	43’ 15”	35”
No. 4	44’ 45”	41’ 35”	3’ 10”
M_a	43’ 55”	42’ 21”	1’ 25”

Table 4

TI and TF results at the $VO2_{max}$ test

Athlete	Initial $VO2_{max}$	Final $VO2_{max}$
No. 1	53,45	58,21
No. 2	58,57	63.34
No. 3	55,7	59.02
No. 4	57,45	64.00
$VO2_{max}$ (ml/kg/min)		

2.7. Comparative analysis of the initial and final results of the athletes

Table 5

Comparative analysis of the IT and FT of athlete No. 1

No	Test	IT	FT	Progress
1	SDR	68’ 50”	67’ 40”	1’ 10”
2	LDR	103’ 40”	101’ 23”	2’ 17”
3	VR	44’	43’ 25”	45”
4	VO_{2max}	53,45	58,21	+ 4.76

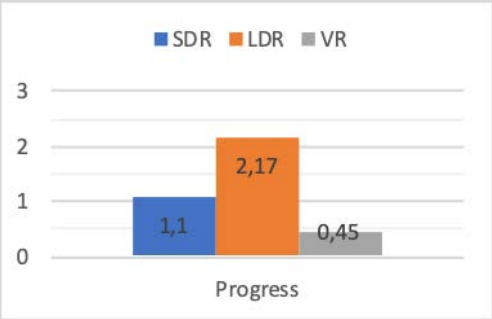

Chart 1. *The progress of the athlete No. 1*

Interpretation of chart No.1:

Following the final test, we notice a progress that consists in improving the initial times of the three samples. In the short distance mountain running test, the initial time was improved by one minute, and in the vertical running test by 45 seconds. The biggest improvement was made in the long distance running test, with a progress of 2 minutes.

Table 6

Comparative analysis of the IT and FT of athlete No. 2

No	Test	IT	FT	Progress
1	SDR	65’ 40”	64’ 40”	1’
2	LDR	92’ 45”	91’ 40”	1.05
3	VR	42’ 20”	41’ 10”	1’ 10”
4	VO_{2max}	58,57	63.34	+ 4.77

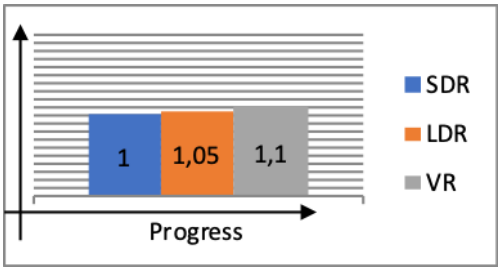

Chart 2. *The progress of the athlete No.2*

Interpretation of chart No.2:

According to the graph, an improvement of about one minute is observed in all samples. However, the greatest progress can be seen in the vertical running test, with a progress of 70 seconds.

Table 7

Comparative analysis of the IT and FT of athlete No. 3

No	Test	IT	FT	Progress
1	SDR	68’35”	67’ 25”	1’ 10”
2	LDR	101’21”	100’ 20”	1.01
3	VR	43’ 50”	43’ 15”	35”
4	$Vo2_{max}$	55,7	59.02	+ 3.32

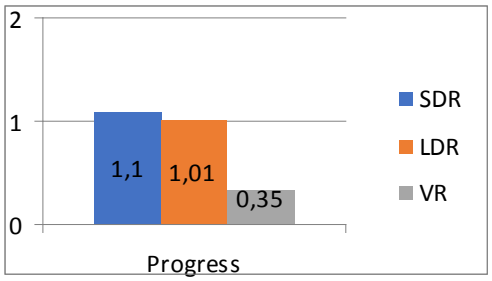

Chart 3. *The progress of the athlete No.3*

Interpretation of chart No.3:

After the new training season, the athlete number 3 recorded one-minute superior times in the short-distance and long-distance mountain running tests, which indicates a good resistance specific to the type of effort. At the intensity test, respectively the vertical run, the time was improved by 35 seconds, which is a remarkable improvement.

Table 8

Comparative analysis of the IT and FT of athlete No. 4

No.	Tests	IT	FT	Progress
1	SDR	68’ 10”	66’ 30”	1’ 40”
2	LDR	100’	93’ 30”	6’ 7”
3	VR	44’ 45”	41’ 35”	3’ 10”
4	$Vo_{2\ max}$	57,45	64.00	6.55

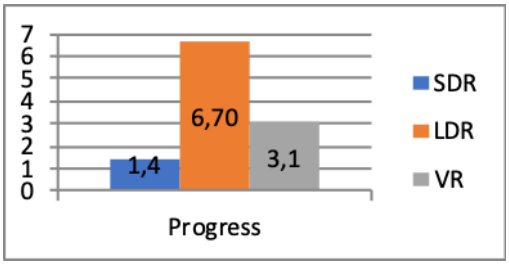

Chart 4. *The progress of the athlete No. 4*

Interpretation of chart No. 4:

The greatest progress is noted in the 6-minute long-distance running, which denotes a qualitative and well-periodized training. Although the progress in the short distance mountain run is only 1 minute, the vertical sports run improved its time by 3 minutes, thus noting the large volume difference accumulated during the training.

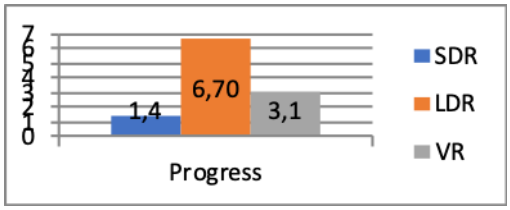

Chart 5. *Ranking of athletes according to the results of the initial testing*

Interpretation of chart No.5:

This graph allows us to rank the athletes in their own and individual rankings. Treating each sportswoman as a unique entity, following a specific training plan tailored to the individual needs, following the study, the level of departure and their initial hierarchy are observed. It is noted that the athlete no. 2 dominates the ranking, having a slightly higher level of preparation compared to the other athletes, this being clearly remarkable especially in the long-distance running test. Also, it can be observed that all four sports are at approximately the same level of training and sports performance.

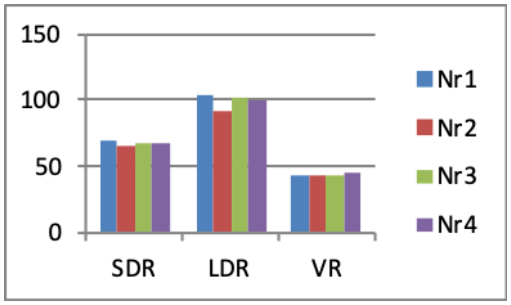

Chart 6. *Athletes ranking in the running tests*

Interpretation of chart No. 6:

The training plan addressed for the physical training of athletes was one of a complex and intense composition, with a large volume of training during the preparatory period and increased intensity during the specific training period. The positive results were to be expected from all four sportsmen. Although athlete number 2 dominated the ranking of the initial samples and maintained an increased level of performance, it is observed that athlete number 4 registered a remarkable increase in all the samples

3. Conclusions

3.1. Following the analysis of the specialized scientific literature, we have found that the specialists in the field are concerned about the existence of modern tendencies to direct the training efforts within the annual cycle of training and participating in competitions for obtaining the sports form. [3]

3.2. Following the preliminary research I found that another way of directing

and orienting the effort is required both in preparation and in competition, based on the development of the specific strength and the speed of movement, by specific means.

Also, according to the study "The Energetics during the World's Most Challenging Mountain Ultra-Marathon - A Case Study at the Tor des Geants", it is confirmed that a large load is absolutely necessary to be implemented in the athletes' training programs. Optimize the training process that governs their performance. [5]

3.3. The experimental training model was validated after applying the research to the four subjects, they registered progress on all 4 control samples.

3.4. Experimental research has shown that directing the training efforts in the mixed and anaerobic area, leads to the increase of the specific resistance and the speed of movement.

4. Practical recommendations

→ Following the research, the results and the conclusions of the research, I consider that the following practical recommendations are necessary:

→ According to [1], the setting of training and performance objectives for athletes is made at the beginning of training in October- November, during which time it is advisable to start the preparation of the new competition season. [1]

→ In the planning and programming of the content of the training, according to [2] it is advisable to take into account the data offered by the analysis of the previous performances of each runner, aiming at the main indicators of effort, as well as the character of the methods and means of preparation.[2]

→ Maintaining the travel speed on as much of the race as possible can be achieved by developing the specific strength and travel speed. This can be achieved by using in the process of preparing the following means, both on flat and varied terrain:

- sustained tempo running;
- repeated running on 1000-10000m portions;
- running with intervals on 200-1000m portions;
- fartlek type run.

→ It is recommended to work in the mixed area, as well as in the aerobic area, depending on the preparation period and stage, with emphasis on the pre-competitive winter and summer stages, as well as on the competitive ones.

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