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MACROSTRUCTURAL DISTRIBUTION OF THE SPECIAL TRAINING TOOLS FOR CLASSIC MOUNTAIN RUNNING IN A MODEL OF PREPARATION FOR "UP AND DOWNHILL" VARIANT

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(Original scientific paper)

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Abstract

In the research it has been observed the distribution of the special training tools, that are very close in their biomechanics and bioenergetics to the racing activity. Special training tools are used for the development of the main factor of achievement „special strength endurance", „special speed endurance" and „special strength-speed endurance".The research aims to establish a basic model of the special training tools volume, by weeks in the macrostructure for training aimed at classical mountain running in variant - "Up and Downhill".Methods: a) research of the weekly volume of the training tools within the framework of the separate mezzo-cycles in the macrostructure and b) variation analysis of the data received from the training tools explored. Conclusions:Development of the main factor of achievement „special strength endurance is the most important part of the specific training. The training tools for the development of the main factors of achievement are concentrated mainly in the preparatory period.The denivelation accumulated with the training tools is with minimal values at the beginning of the preparation period and is gradually increasing, reaching the highest values in the stage of the early racings. During all stages of the preparation, the positive denivelation is a bit more than the negative.

Key words:

Introduction

Mountain running is an endurance sport that is becoming more and more popular all over the world. Mountain running competitions precede the ancient and modern Olympic Games. Despite its long history in athletics, mountain running is one of the newest disciplines. As part of World Athletics,mountain running disciplines have a clear classification, which defines the technical parameters of every discipline (1,2,3). That allows for planning and conducting highly specialized training, compliant with the specifics of the discipline itself. In the practice for high sports achievements often and more often is conducted a preparation directed to a specific racing course, on which the main racing will be conducted. We can admit that in the specialised methodological literature, there are no detailed models on the distribution of the training tools for the training of mountain runners. Recent research is looking in that direction – creating of annual training model, based on the research of the training programs directed to the World Championship in its variation „Downhill and uphill" in the 39th week.

The prepared by us model of achievement in mountain running, consisting of main factors and hierarchically ordered subfactors, defining the level of the final sports result (shown in Figure 1) (4), and classification of training tools for their development (5), are giving the basis for creating models of the distribution of the training tools.

Modern trends in the development of mountain running are requiring annual planning to be completed with purposeful preparation, according to the specific conditions of the major competitions. In that relation, the successful realization of the potential of the mountain runners depends to a higher order on the optimal usage and distribution of the special training tools, which coincide with biomechanics and bioenergetic to the racing activity. Those are the special tools, directed toward the development of the main factors of the achievement (shown in Table1) (4).

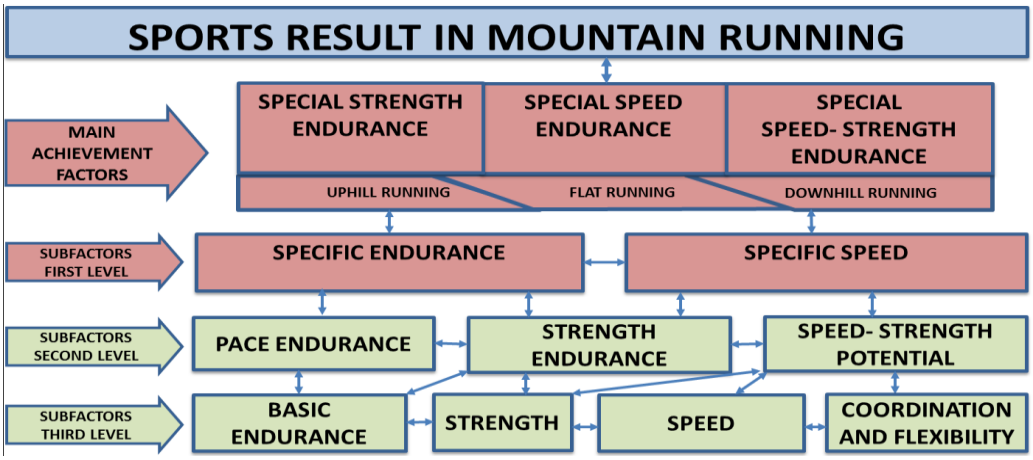

Figure 1. Model of the sports result in mountain running.

Table 1. Special training tools for developing the main achievement factors, their bioenergetic regime and the conditions under which they are performed

MAIN ACHIEVEMENT FACTORS	BIOENERGY REGIME	SPECIAL TRAINING TOOLS	TERMS OF PERFORMANCE
SPECIAL STRENGTH ENDURANCE	3.Aerobic-anaerobic regime	1. Control racing running 2. Paced extensive (interval) running 3. Long variable running (Fartlek) 4. Intensive long running	1. Up a small slope of 4 ° 2. Up a medium slope 8 ° 3. Up a big slope 12 ° 4. Up an extreme slope 16 ° 5. Mostly a flat section 6. Down a small slope 4 ° 7. Down a medium slope of 8 ° 8. Down a big slope of 12 ° 9. Down an extreme slope of 16 °
SPECIAL SPEED ENDURANCE	2.Aerobic regime 2		
SPECIAL SPEED-STRENGTH ENDURANCE	2.Aerobic regime	5. Aerobic developmental running 6. Aerobic building running	

Purpose of the research is to define a principal annual model of the distribution of the volume of the special training tools by weeks in preparation for variation of racing "downhill and uphill" in classic mountain running.

Methods

Research objectives

1. Defining the volume of the special training tools in the macrostructure of the preparation and the application of those tools according to factors of achievement.
2. Analysis of the distribution of special training tools by weeks in the macrostructure.

The object of the research is the training and sport-racing activity in mountain running, and the **subject** is the special training tools, used in the preparation of mountain runners.

The scope of the research is 29 training programs for mountain runners.

The methodology of the research includes:

1. Analysis of the scientific-methodology literature for long running and mountain running.
2. Research of the weekly volume of the training tools in the frame of the separate mesocycles in the macrostructure of the training programs of the runners.
3. Variation analysis of the data for training tools in the macrostructure.
4. One part of the researched literature sources are looking at the problems of the specialized diversity of the training tools (6,7), and the other part is considering the specific of the racing courses in mountain running (8,9) and training methodology (10,11,12,13,14,15,16,17,18). A total of 29 training schedules of highly qualified racers have been reviewed.

Results

In table 2 are presented the average values of the weekly volume distance and denivelation of the special training tools in the researched training programs.

Table 2. Special training tools.

Weeks	Special tools for the development of the main achievement factors					
	Special strength endurance		Special speed endurance		Special speed-strength endurance	
	Distance in kilometers	Ascent in meters	Distance in kilometers	Descent in meters	Distance in kilometers	Descent in meters
1	4	410	3	260	0	0
2	10	1150	4	350	0	0
3	11	1110	3	260	1	280
4	11	1140	2	200	1	290
5	16	1570	3	270	1	300
6	14	1310	4	360	1	310
7	15	1480	6	560	1	280
8	22	2030	4	370	1	300
9	20	1800	4	360	1	290
10	17	1620	5	550	2	490
11	16	1490	6	560	1	280
12	20	1850	5	480	2	460
13	14	1310	5	460	1	240
14	20	1890	5	470	2	470
15	18	1790	6	560	1	230
16	20	1830	8	730	1	200
17	17	1710	9	890	2	470
18	18	1700	7	610	1	280
19	11	1020	10	920	2	440
20	11	1030	8	750	1	230
21	9	810	2	160	1	240
22	9	890	12	1100	1	250
23	10	910	10	910	1	230
24	8	680	8	740	1	260
25	6	540	6	540	1	250
26	2	140	1	0	0	0
27	3	220	0	0	0	0
28	5	510	5	510	0	0
29	1	80	1	0	0	0
30	0	0	0	0	0	0
31	0	0	0	0	0	0
32	6	570	6	570	0	0
33	0	0	0	0	0	0
34	12	1180	0	0	0	0
35	0	0	0	0	0	0
36	0	0	0	0	0	0
37	0	0	0	0	0	0
38	0	0	0	0	0	0
39	6	610	6	610	0	0
40	0	0	0	0	0	0
41	6	600	6	600	0	0
42	6	580	0	0	0	0
43	12	570	0	0	0	0
44	6	560	0	0	0	0
45	0	0	0	0	0	0
46	1	80	0	0	0	0
47	4	370	4	70	0	0
48	1	90	0	0	0	0
49	1	70	0	0	0	0
50	2	180	0	0	0	0
51	8	630	8	700	0	0
52	3	280	3	280	0	0
Total	432	40390	185	16760	28	7070

Analysis of the annual volume of the special tools developing the main factors of achievement

The special training tools are accomplished through running in slopes of 9 degrees of steepness (shown in Table 1) (5). 67% of the distance in these tools is directed to the factor „special strength endurance“. For „special speed endurance“ is 29%, and for „special strength-speed endurance“ is at least 4% from the distance of the special training tools (shown in Figure 2).

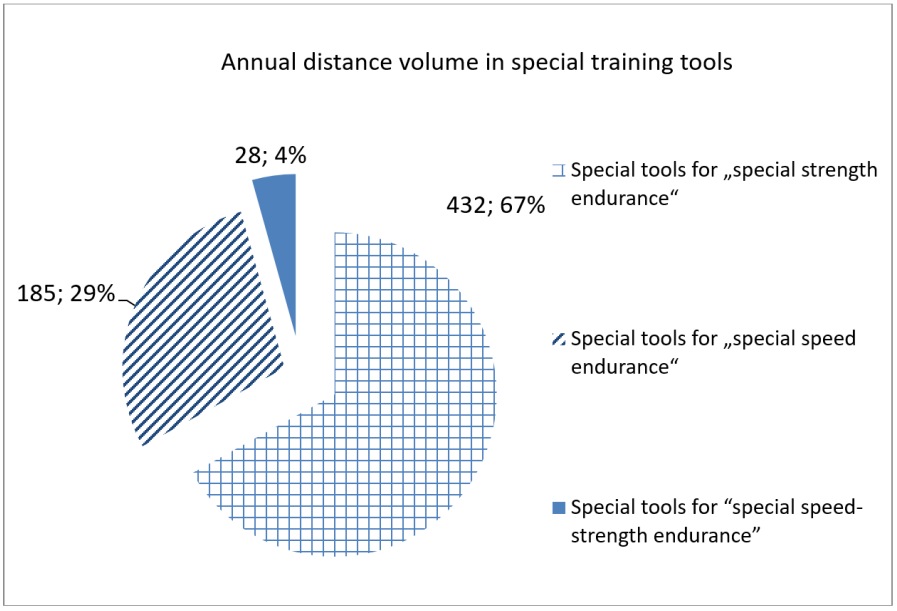

Figure 2. Annual kilometre volume of special training tools according to their focus on the main factors.

The positive denivelation of the special training tools is 40 000 meters and is accomplished only through running uphill for developing „special endurance”.

The annual volume of the negative denivelation in the special tools is 17510 meters. It comes from downhill running for the development of the factors „special speed endurance“ and „special strength-speed endurance“ in an average ratio of 7:3 (shown in Figure 3).

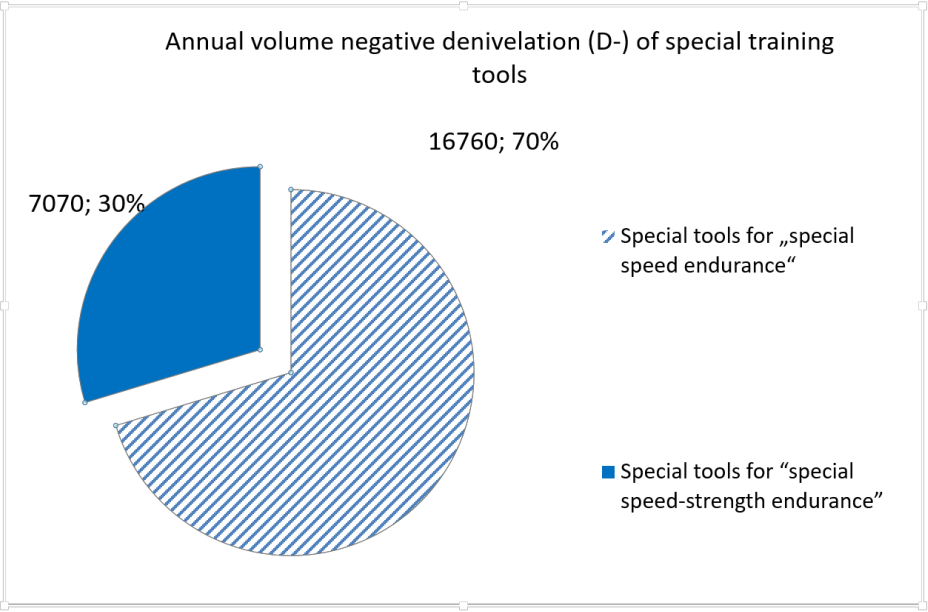

Figure 3. Annual volume in meters negative denivelation of special training tools according to their focus on the main factors.

Analysis of the distribution of the volume of special tools developing main factors of achievement by weeks in the macrocycle

Figure 4 shows how the volume of special tools for the development of the main factor „special strength endurance“ is concentrated predominantly in the preparation period and the racing runs during the racing and the transient periods. It is visible, that the highest values are achieved during the second half of the general preparatory stage and in the first part of the special preparatory stage, where it mostly varies between 15 and 20 km weekly.

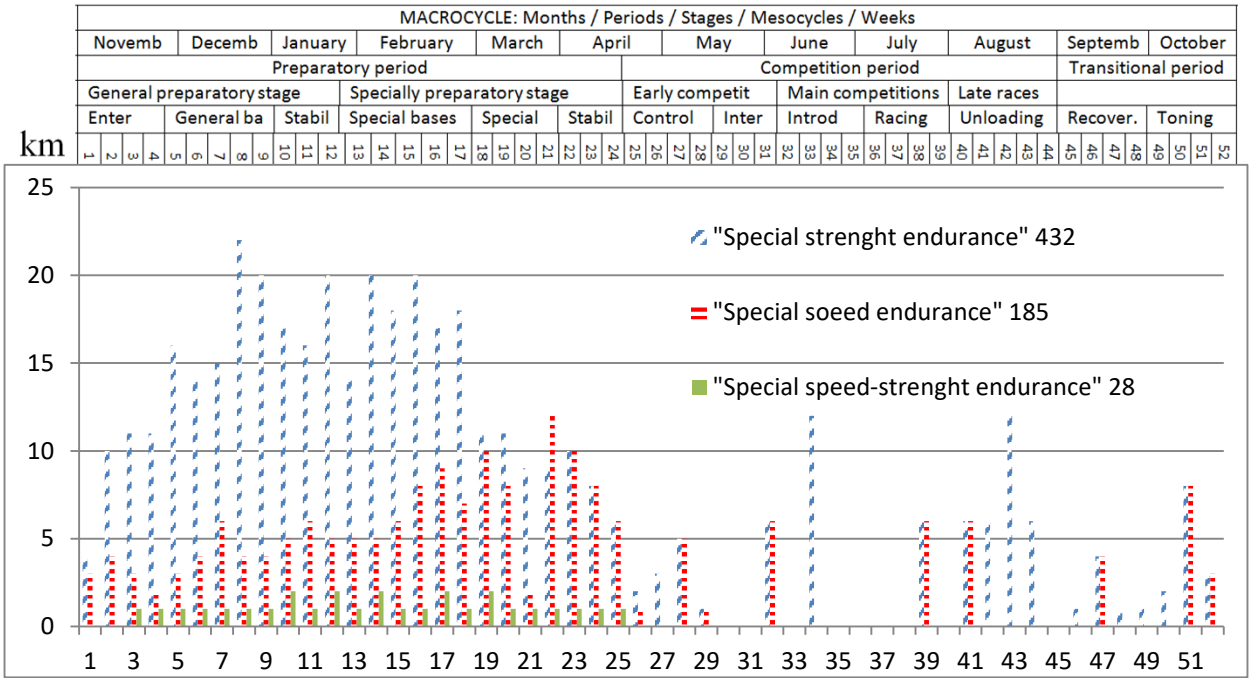

Figure 4. In the frame of macrocycle on the abscissa is shown the weekly distribution of the kilometres of special tools for the development of the main factors for achievement.

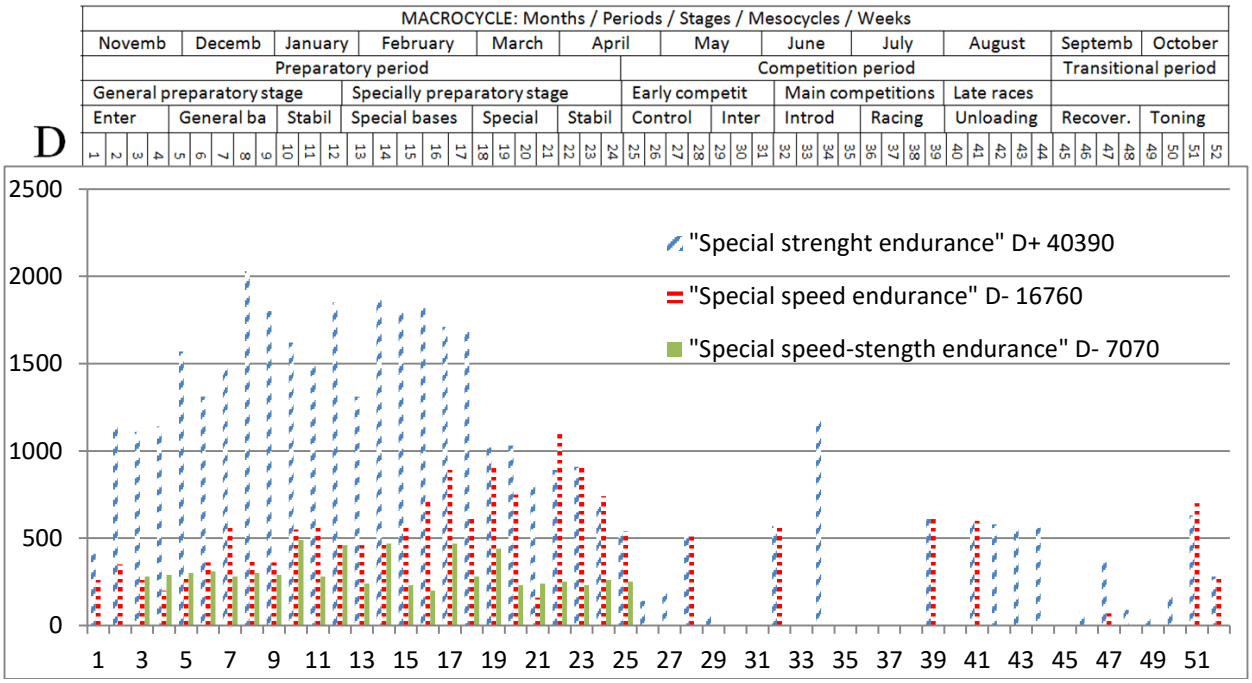

Figure 5. In the frame of the macrocycle on the abscissa is shown the weekly distribution of meters denivelation of the special tools for the development of the main factors of achievement.

Tools that are directed to the development of the main factor „special speed endurance“ are also distributed mainly in the preparation period and in the racing running during the racing and transient periods. But their volume at the beginning of the preparation period is lesser/smaller and increases gradually reaching maximal values at the end of the special preparatory stage. Most often the weekly volume is around 5-6 km, and only in the second half of the special preparatory stage, it reaches around 10 km.
The volume of training tools for the development of the factor „special strength endurance“ is minimal, in comparison with that of the other main factors and it is distributed almost equally in the whole preparatory period. The weekly volume in that period is around 1 – 2 km.

The distribution of the denivelation of the tools for main factors of achievement in the frame of the macrocycle is similar to the distribution of their distance but still, it is not identical. The biggest denivelation is accumulated in the second half of the general preparatory stage and in the first two-thirds of the special preparatory stage, where it often exceeds 1500 meters weekly (shown in Figure 5).

Conclusion

1. The development of the main factor of achievement „special strength endurance ‘‘ is the most important part of the specific training.
2. The training tools for the development of the main factors of achievement are concentrated mainly in the preparatory period.
3. The denivelation accumulated with the special training tools is with minimal values at the beginning of the preparation period and is gradually increasing reaching the highest values in the stage of the early racings.
4. During all stages of the preparation, the positive denivelation is a bit more than the negative.

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