STRUCTURE OF THE POWER POTENTIAL OF ADOLESCENT RACERS IN RUNNING AT 800M.

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Summary

A study of the overall strengths of 28 adolescents specializing in running 800m was presented. Variant correlation structure of force total force has been identified. Certain basic methodical postulates have been confirmed and relevant methodological conclusions and recommendations have been made.

Keywords: Power Opportunities, Running 800m, Adolescents

Modern sport is characterized by continuous "rejuvenation". The age to begin systemic sports training is decreasing. The age of the athletes who achieve high sports scores (Alabin,1986; Antonov, 1987; Aryamov,1950; Belberov, Dimitrov,1980; Bonov,2003; Balik,1974; Bolkov,1961; Lazarov, Popov,1972; Lidyad,1966; Rachev,1999; Rachev,1976; Slanchev,1998; Stoyanova,1976; Travin,1975; Filin,1979) is also falling. This phenomenon implies an increase in stressful situations and a risk of overloading the body of young athletes. In this sense, the disclosure of the complex multi-parametric characteristic of specific athletic activity is one of the perspective ways to solve the problem of optimizing the workloads of this category of athletes (Bonov,1984; Bonov,2003; Zelyazkov, Dacheva,2002; Lazarov,1965; Lazarov, Popov,1972; Lidyad,1966; Makarov, 1966; Filin,1979;). The effectiveness of these loads greatly depends on the level of muscle strength. According to Prof. M. Bachvarov, the strength of athletes is comprised in the following three main categories: local, regional and total. Each of these categories has a different attitude towards the improvement of the specific sports performance, respectively the level of the sporting result.

In the sense of these rations, we synthesized the following working hypothesis of our study:

By examining the structure of the power potential in medium-age adolescents aged 15-19 years from the Hellenic Republic, we can help to improve the training process for this category of athletes.

The purpose of this study is as follows:

Increasing the effectiveness of the training process in 15 - 19-year-old athletes from the Hellenic Republic specializing in medium distance running by identifying the interdependencies between the main indicators for monitoring their power potential and sports performance.

The achievement of the stated goal implies the following basic tasks:

1. Analysis of scientific and methodological literature on the problems of medium distance running.
2. Investigation of the correlation structure of the power potential in girls / 15-19 years old / athletes and medium distances.
3. Outline some basic methodological aspects related to the improvement of the strength training in the age of 15-19 years in girls specializing in medium distance running.

The subject of the survey is 28 mid - adult contestants aged 15-19. with an average score of 800m-2,15,36min. They are included in the rankings of the top 20 racers (girls / in Greece during the 2014 and 2015 races

The subject of the study is a structure of the power potential of 15-19 year old girls specializing in medium-distance running.

Experienced individuals were subjected to testing based on a set of tests based on sport theory and practice on the determination of total power capabilities. They are presented in Table 1.

1. Body weight (kg)
2. Stand force (kg)
3. Wide right wrist (kg)
4. Wide left wrist (kg)
5. Long jump from place (cm)
6. Triple jump from place (cm)
7. An average height of 30 vertical jump
8. Sum of 30 vertical jumps (meters)
9. K (coefficient) strength endurance (w/kg)
10. KN (load tolerance coefficient) (w/h/min)
11. Running speed at 800m. (m/s)

Table 1 Tests (general description)

Testing was performed under the same conditions for 5 days in laboratory and field conditions. A basic requirement was that individuals surveyed should approach the appropriate testing as highly

motivated and physically recovered. In view of this, the following sequence was followed:

- 1 day) Measurement of weight, strength and local force of the wrists (m 1, 2, 3)
- 2 days) Measurement of speed-force capabilities (m5,6)
- 3 days) Measurement of strength (p.7,8,9,10)
- 4 day) Pre-heating
- 5 days) Racing race at 800m.

The obtained results were subjected to mathematical and statistical processing, by variation and correlation analysis.

The variation analysis of the test results revealed some general and specific peculiarities in the level of the strength of the investigated persons. They are evident in Table 2.

Table 2 Variation analysis of the obtained results.

	M.U.	number studies	X min	X max	R	X	St	V%	Ac	Ex
Body weight	kg	28	39,8	64,4	24,6	52,40	6,21	11,84	0,16	-0,39
Stand force	kg	28	55	125	70	89,79	17,95	19,99	0,06	-0,89
Wide right wrist	kg	28	20	43	23	31,68	5,86	18,49	0,16	-0,35
Wide left wrist	kg.	28	20	42	22	29,87	6,25	20,93	0,24	-0,79
Long jump	cm.	28	192	256	64	223,08	13,31	5,97	-0,08	0,22
Triple jump	cm.	28	551	742	191	651,79	50,79	7,79	0,00	-0,59
Maximum vertical jump	meter	28	0,20	0,38	0,18	0,28	0,04	15,35	0,04	-0,29
Sum 30 jump	meter	28	2,98	6,14	3,16	4,37	0,80	18,40	0,21	-0,20
K	Wat/kg	28	510,38	1374,14	863,76	830,08	203,03	24,46	0,60	0,44
KN	W/h/min	28	3,28	7,63	4,36	4,92	1,04	21,05	0,65	0,38
800 meter	m/sek	28	5,57	6,36	0,79	5,91	0,18	3,09	0,43	-0,03

At $n = 28$, $a = 0.05$ $As = 0.621$ $Ex = 0.858$

Table 2 presents the results of the variation analysis of girls' data.

The values of the results in Test # 1 indicate that the body weight of the tested girls is in the optimal range - $1 = 53.25$ kg. The coefficient of variation - $V\% 1 = 9.47$ confirms the homogeneity of these data.

The results of the Dynamometric Tests 2, 3, 4 provide information on the level of total (m 2) and local strengths (m 3,4). of the girls. They have average values and widening widths as follows: $x 2 = 94.5$ and $R2 = 30$; $3 = 32.6$ and $R3 = 14$; $4 = 30.5$ and $R4 = 10$. It is clear from this that the girls surveyed have certain differences within the results, which is confirmed by the coefficients of variation from 8.87% to 12.5%.

We determined the speeds of the lower limbs using test data 5, 6. The average values of the results and the width of the span are as follows: $5 = 220.3$ cm. at $R5 = 36$; $6 = 638.5$ cm. at $R6 = 139$. Here there is a marked uniformity of the results ($V\% 5 = 5.0$, $V\% 6 = 6.9$). This suggests that the speed-force capabilities of the lower limbs are an important feature of the specific driving capabilities of adolescent racers in running 800m. It appears to be a serious criterion for determining the genetic potential for development. The results in tests No. 7, 8, 9 and 10 characterize the strength of the tested males. Based on these indicators, the tested persons achieved the following mean values: $7 = 0.27$ and $R17 = 0.13$; $8 = 417.13$ and $R8 = 282.18$; $9 = 717.6$ and $R9 = 493.51$; $10 = 4.6$ and $R10 = 3.99$. Significant differences in data homogeneity are observed here. This fact is

confirmed by the coefficient of variation which is as follows: $V\% 7 = 18.5$, $V\% 8 = 21.5$, $V\% 9 = 21.5$ and $V\% 10 = 28.7$.

The average level of achievement in the 800 meter run, Test No. 11 2: 15.23 min, is $x_{11} = 5.48 \text{ m/s}$. (average running speed at 800m measured in m / sec) at a width of $R_{11} = 0.6 \text{ m/s}$. The coefficient of variation from $V_{11} = 3.5$ confirms the uniformity of the sporting technical level of the study group. This is a serious reason to continue with the analyzes of intercorrelation interdependencies

between the studied power potential parameters. Revealing the structure of this potential would allow some methodological guidance to be drawn on the planning and management of the training of competitors in running 800.

From the correlation analysis table no. 3 and fig. 1 it is evident that the correlation structure of the sporting result in the 800 m running in the examined athletes is expressed by 28 significant correlation dependencies at $r = 0.05$, $P = 95\%$ and level of significance $\alpha \geq 0.330$.

Tab. 3 Intercorrelation Structure of Power Potential

	1	2	3	4	5	6	7	8	9	10	11
1	1										
2	0,755	1									
3	0,468	0,542	1								
4	0,630	0,589	0,703	1							
5	0,410	0,448	0,216	0,268	1						
6	0,633	0,573	0,312	0,435	-0,06	1					
7	-0,06	-0,02	-0,03	0,012	0,126	0,792	1				
8	0,585	0,513	0,330	0,330	0,053	0,695	0,786	1			
9	0,453	0,418	0,246	0,246	-0,01	0,614	0,740	0,522	1		
10	0,508	0,436	0,283	0,283	-0,06	0,655	0,755	0,508	-0,04	1	
11	0,226	0,122	0,102	0,100	-0,18	0,219	0,175	0,438	0,063	0,281	1

$N=28$; $\alpha=0,05$; $p=95\%$; $r=0,330$

There is a significant correlation between the sport result and the speed potentials of the lower limbs (test n° 7) $r = 0.634$. It should be noted that the major correlations obtained with the local strengths $r_3 = 0,789$, $r_4 = 0,747$ (test n° 3, 4) at expert level cannot be accepted as a significant factor regarding the level of the sport result in 800m running. However, they should be taken into account within the overall strength training curve in some preparatory meso and microcycles of preparation.

The analysis of other significant correlation dependencies is important as an objective tool for diversifying the training process on the basis of the so-called positive contribution of training.

Strength

Test No. 9 (Strength Strength Σ) has a high correlation with Test No 8 (Average Maximum Rebound) $r = 0.886$, No.7 (average height of 30 vertical bounces) $r = 0.964$ (very large), No.10 (coefficient of Load tolerance) $r = 0.772$.

These are indicators that are informative about the speed-strength endurance and are important to maintain the optimal frequency and length of the step.

Speed power options

The rapid power of the lower limbs test no. 5,6 correlate with the results in tests with numbers 1 (body weight), 2 (stative force), 7,8,9,10 (strength endurance) Correlation with tests 5 and 6 (jump in length and triple jump from place) $r = 0.727$, which is quite logical and suggests in some cases interchangeability in the control of the training effects. An interest is a link between the lower-extremity power-ups with a test n° 1 (body weight) $r = 0.634$, which suggests the importance of optimal body weight for the performance of force quality. The girls' card shows that significant differences in strength and strength stamina determines differences in sporting outcomes. Training for these athletes should focus on raising the level of strength.

Conclusions and recommendations

The results and analysis of the conducted study allow to be summarized in the following conclusions and recommendations:

1. The power potential of adolescent racers in the 800 meters' race is determined by the optimal ratio of the local, regional and total strengths of the athletes.
2. Maintaining optimal body weight is one of the main tasks of the training process in the category of athletes surveyed.
3. Current testing of speed-power capabilities is the vehicle of up-to-date information on the momentary state of the specific force in adolescent racers in the 800 meters' race.
4. The tests for the assessment of the speed and the strength of the lower limbs have a markedly high factor weight in the planning and control of the training process in adolescent racers in the 800m race.

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