Methods of organizing special strength training for young short-distance runners in a one-year training macrocycle

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Abstract

Objective of the study was to develop and substantiate a methodology for organizing special strength training for short-distance runners aged 14-15 years in an annual training cycle.

Methods and structure of the study. The experiment involved young sprinters training at the sports school in Al-Diwaniya (Iraq). An experimental group (EG, n=13) was formed, classes in it were conducted on the basis of the author's methodology for organizing special strength training for sprinters in a yearly cycle, and a control group (CG, n=15), which trained according to the program generally accepted in Iraq for this contingent .

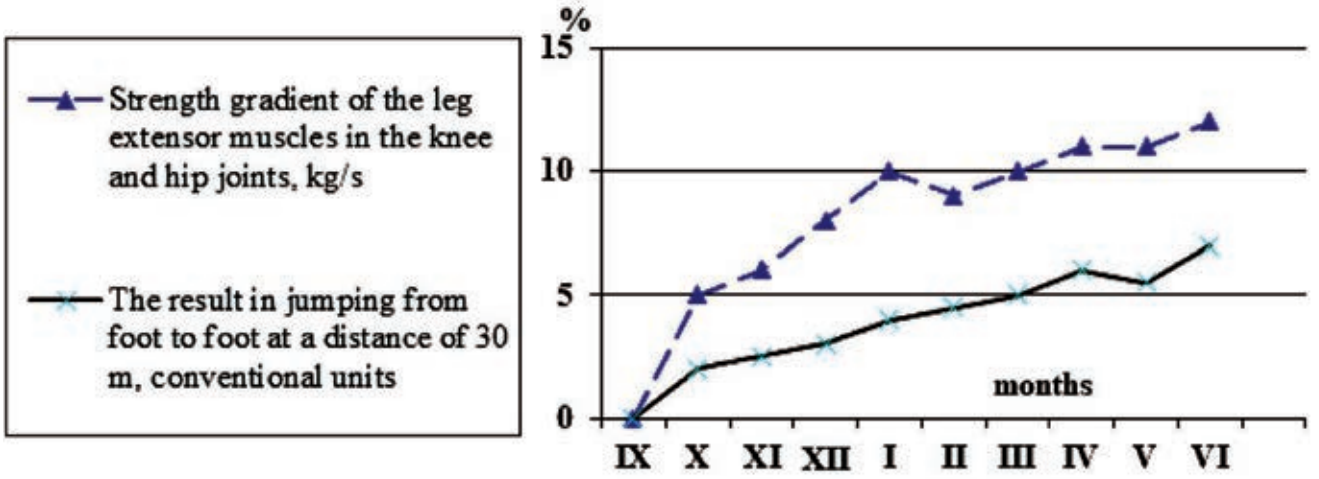
Results and conclusions. The results of an experimental verification of the developed methodology for organizing special strength training for short distance runners aged 14-15 years in the annual training cycle are presented. The data obtained testify to the productivity of this technique, as well as the content of the normative indicators that assess the readiness of young sprinters.

Keywords: *young runners, sprint, methodology, strength training, annual cycle, organization.*

Introduction. In practical work for coaches, it is of interest to determine the fundamental direction of the training process of athletes at the stages of their long-term improvement, which makes it possible to properly specify the predominant nature of certain training influences in the annual training cycle. At present, a large amount of methodological material has been accumulated on the use of various speed-strength exercises in the training of runners, aimed at increasing the speed of running [2, 4, 8]. However, the problem of choosing rational means of special strength training and the peculiarities of their use at the stages of a year-long training of young sprinters have not received sufficient justification and theoretical explanation.

Objective of the study was to develop and substantiate a methodology for organizing special strength training for short-distance runners aged 14-15 years in an annual training cycle.

Methods and structure of the study. Based on our own results of the study [3], the generalization of the practical experience of organizing training in sprint for young athletes in the Republic of Belarus and Iraq, as well as the analysis of literature data [1, 6, 8], a methodology was developed for organizing special strength training for sprinters 14- 15 years in an annual cycle. The methodology includes the predicted dynamics (model) of young sprinters' special strength readiness indicators in the annual cycle and a rational quantitative combination of the content and distribution of the volume of the runners' main training tools, taking into account the specifics of their training at specific stages of the macrocycle (figure). It was assumed that the use of the methodology can stimulate the growth rate of the special preparedness of young athletes in the most favorable period of the natural development of their body.



Training Tools	Volume per macrocycle (X±σ)	Load distribution by months (%) of the total volume for the macrocycle									
		IX	X	XI	XII	I	II	III	IV	V	VI
Running up to 80 m (95-100%), km	11,0±1,5	-	-	-	11	14	14	16	17	17	11
Running 100-300 m (91-100%), km	13,0±3,5	-	8	12	14	16	16	14	10	6	4
Running 100-300 m (80-90%), km	32,0±4,5	7	15	15	17	18	12	7	5	3	1
Running over 300m (below 80%), incl. cross, km	60,0±9,8	13	10	17	18	14	11	8	7	1	1
Jumping exercises, km	6,0±1,0	18	15	10	12	12	11	9	6	5	2
Various strength exercises	65,0±5,0	11	14	19	16	15	10	5	5	4	1
Games and game exercises, hours	75,0±3,5	17	18	15	13	12	10	6	3	2	1
General developmental exercises, hours	50,0±3,5	15	18	15	12	10	10	8	7	4	1

Methodology for organizing special strength training for young sprinters in a one-year training macrocycle: at the top - the predicted dynamics in the macrocycle of the indicators of the explosive strength of the leg extensor muscles and the result of the jump test (in %); below - the main means of preparation and their distribution in the macrocycle as a percentage of the total (100%) volume

To test the effectiveness of the implementation of the training methodology, young sprinters training at the sports school in Al-Diwaniya (Iraq) took part in the experiment. An experimental group (EG, n=13) was formed, classes in it were conducted on the basis of the developed methodology for organizing special strength training for sprinters in an annual cycle, and a control group (CG, n=15), which trained according to the generally accepted (traditional) in Iraq for of this contingent to the program adopted for educational and sports institutions.

Results of the study and their discussion. When developing the structure of the annual training cycle for young sprinters aged 14-15, the main attention was paid to the problem of optimal training planning for young athletes, which provided for such an organization of training that would exclude forcing their training. Based on the received factual material, the following directions were identified in the organization of training of young runners, designed to reduce this probability.

1. It is planned to reduce the volume of running at maximum speed by 10–15% among young Iraqi runners, since, according to specialized literature, it is not advisable to focus on highly specialized speed training at the initial stages of long-term improvement [1, 6]. At the same time, the fact was taken into account that the use of a significant amount of speed-strength exercises, games and game exercises aimed at developing speed and strength contributes to a more successful formation and consolidation of motor skills.

2. It was planned to increase (by 20-25%) the volume of general physical training, which was recorded in the young sprinters of the Republic of Iraq. At the same time, the introduction of gaming exercises, outdoor and sports games, etc. was predominantly carried out. into the training process of young Iraqi sprinters. The total fulfillment of the volume of the annual load of special physical training means is calculated. The volume of the latter was no more than 40-50% of similar training means for more qualified sprinters.

Changes in indicators of running and special strength readiness of young sprinters aged 14–15 in the control (CG) and experimental (EG) groups during the pedagogical experiment

Indicators	CG		EG	
	Relative growth, %	p	Relative growth, %	p
Running 100 m from the start, s	3,4	>0,05	9,3	<0,05
Running 20 m on the move, s	3,5	>0,05	6,2	<0,05
Running 60 meters from the start, s	3,9	>0,05	5,2	<0,05
Standing long jump, m	8,1	<0,05	15,8	<0,05
Triple jump from a place, m	10,9	<0,05	18,7	<0,05
30 m jumping from foot to foot, c. units	9,3	<0,05	13,4	<0,05
Shot throw with two hands from the bottom forward (3 kg), m	12,5	<0,05	17,7	<0,05
Absolute strength of leg extensor muscles, kg	8,8	<0,05	13,4	>0,05
Strength gradient of leg extensor muscles, kg/s	4,4	>0,05	21,9	<0,01
The strength of the leg extensor muscles in 0.1 s, kg	4,5	>0,05	24,8	<0,01

3. In accordance with the recommendations of specialists in the field of children's and youth sports [1, 6], when organizing the load on monthly cycles, there is no rigid concentration (more than 20% of the annual load per month) of unidirectional agents (which is typical for adult athletes!). The fact was taken into account that the deployment of the required adaptive processes in the body of athletes under the influence of training influences determine the volumes and intensity of the latter, and when building the educational and training process of a young sprinter, it is necessary to try to select exercises that provide the best development of the abilities that are dominant for the specifics of motor activity [3, 5, 7, 8].

4. It was also taken into account that the age of 14-15 years is characterized by hormonal changes in the body and active growth processes, which directly imprints the body's responses to external stimuli. And if for highly qualified sprinters volume is mainly a quantitative characteristic, then for young sprinters high volume can become a factor intensifying the training load.

Based on a comprehensive analysis of the training conditions and in accordance with the objectives of the experiment, the next step was to develop the structure of the annual cycle for the sprinters of the experimental group. In Iraq, a one-cycle periodization of the annual training cycle for young athletes has been adopted (competitions are not held in winter). Therefore, the presented materials were concretized and refined for the conditions of Iraq, and the load parameters were distributed for a single-cycle periodization of the annual cycle. Annual changes in the indicators of running and special strength training of sprinters aged 14-15 in the experimental and control groups are presented in the table.

It can be seen that a number of changes in the performance of young runners in the control group, at the end of the formative experiment, are statistically significant. At the same time, the increase in sports results, as an integral indicator of the effectiveness of the organization of the training process, indicates a less significant contribution of these characteristics in sprinters from the CG to their final result in the 100-meter run.

In the experimental group, all recorded indicators (with the exception of the absolute strength of the leg extensor muscles) statistically significantly improved compared to the initial level and surpassed the indicators of the control group. In our opinion, this can be explained by different approaches to the organization of special strength training in the annual cycle and at its specific stages. So, in the EG, the volume of running at maximum speed was significantly reduced, but at the same time, emphasis was placed on increasing the length of the running step of young sprinters with the help of targeted speed-strength exercises, which made it possible, while maintaining the pace of running, to increase the maximum speed. If we compare the initial and final indicators of the characteristics aimed at the rapid achievement of maximum strength in the shortest period of time (the gradient of the strength of the leg extensor muscles and the strength of the leg extensor muscles manifested in 0.1 s), then it can be noted that they have a high statistical significance of differences in the EG ($p<0.01$). This can be interpreted by the influence of the applied training program, in which the annual volume of speed-strength training was increased.

Thus, the means used in the experimental group caused more dramatic changes in the strength char-

acteristics of muscle groups that carry the main load in speed running and the potential growth of sports results in sprinting depends on the development level of which.

Conclusions. The data obtained testify to the productivity of the developed methodology for organizing special strength training for 14-15 year old sprinters in the annual training cycle, as well as the content of the normative indicators that assess the preparedness of young sprinters. The experimental substantiation of the methodology led to positive changes in the characteristics of special strength training of young sprinters at a statistically significant level, and an increase in sports results, as an integral indicator of the effectiveness of the organization of the training process, indicates a significant contribution of these characteristics to the final result in the 100-meter run.

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