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Scientific and pedagogical bases of training students of track and field athletes in running events

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Abstract

Purpose: to improve the methodology of complex training of student-athletes in running track and field athletics.
Methods: Using Polar h10, Polar M430, beurer PM90 devices), anthropometry (bioimpedance measurement of body composition using "Mi Body Composition Scale 2", instrumental method (mobile electronic starter) and methods of mathematical statistics.
Results: The average index of results in the control test of 150 m running, where speed and strength qualities are determined, before the pedagogical experiment was equal to 17.46±1.01 s, and at the end of the experiment the average index of results was 16.74±0.91 s. During the pedagogical experiment, the absolute increase of the result improved by 0.72 s. The percentage gain was equal to 4.1% ($p>0.05$).
According to the results of the research of the 1000 m running test to determine the speed endurance of short distance runners at the beginning of the experiment, the experimental group subjects showed the following results: at the beginning of the experiment the average index was equal to 175.5±6.84 s, and at the end of the experiment 170.1±6.44 s. The absolute increase of the result amounted to 5.40 s. As a percentage, the result was equal to 3.1% ($P<0.05$).
Conlcusion: The effective development of physical qualities and growth of sports results of short, middle and long distance runners training according to the developed training program directly depends on their complex preparation.
The results of the study showed that when applying the developed method of multi-joint pumping for the development of the functional state of physical fitness, technical and tactical training, as well as the development of methods, comprehensive control and evaluation scale of physical qualities, in short distance runners in the 100m race at the beginning of the study the result was equal to 11.81±0.87 s at the end of the study the result increased to 11.19±0.78 s, the difference in the result averaged 0.62 s. In percentage, the results were equal to 5.2% and $P<0.05$. In the 800m run at the beginning of the experiment, the result was 121.8±13.4 s and by the end of the experiment, the result improved to - 112.4±11.19 s. The difference in the increase of results amounted to 9.4 s, indicating an increase in results by 7.7% $P<0.01$. In long distance runners in 5000 m race at the beginning of the pedagogical experiment the result was 1170,0±112,3 s and at the end of the study the result was equal to 1023,5±109,6 s. Absolute increase at $P<0.001$ value was 12.5% and this is an improvement of 146.5 s.

Keywords: methods for optimizing, middle and long distance, developed muscles, athletes' body length.

Introduction

In the world, increasing competition in athletics competitions, as the analysis of sports results shows, requires improving the system of training athletes on the basis of new technologies. Improvement of complex training of highly qualified athletes in running athletics is considered to be one of the most important tasks in the modern world. Selection of athletes in running sports for multi-year stages of training and orientation to specialization, planning of training processes, preparation for prestigious sports competitions are increasingly attracting the attention of the world community. At various stages and periods of annual training of athletes such tasks as training sessions, improvement of physical, technical-tactical, functional, psychological preparedness, maintenance of sports form in the course of training and competitive activity require timely solution.
All over the world, based on the tasks set in the system of training athletes, scientific research is conducted on the selection and orientation to narrow specialization, preparation for sports competitions at different stages and periods of training, distribution of training loads taking into account the anatomical, physiological and psychological features of their organism, as well as rational management of training sessions of athletes. Many specialists have developed prospective plans of annual and multi-year sports training. However, from year to year at championships, World Cups and Olympic Games there are new athletes showing high results, which is proof of the development of improved variants of training programs on a permanent basis.

As a result of scientific research, methods for optimizing the volume and intensity of training loads for short, medium and long distances, distribution of loads in aerobic, mixed and anaerobic modes, the number of performance of these loads have been developed, but the problems of complex training of student-athletes are not sufficiently studied. To date,

scientific and pedagogical justification of rational distribution of training load components in the complex training of athletes, taking into account their individual characteristics is one of the urgent problems in the system of training athletes.

Methods

The research includes scientific and theoretical analysis of domestic and foreign literature sources, generalization of specialists' experience, pedagogical experiments, pedagogical observation, questionnaires, pedagogical testing, study of the functional system (using Polar h10, Polar M430, beurer PM90 devices), anthropometry (bioimpedance measurement of body composition using "Mi Body Composition Scale 2"), instrumental method (mobile electronic starter) and methods of mathematical statistics.

Results and discussion

At the beginning of the pedagogical experiment, a test was conducted in 5000m running, where the level of functional state of runners was revealed, intensity zones, running pace, energy expenditure were determined, and the results are presented.

The results of the pedagogical experiment, conducted to determine the level of functional fitness, showed that the long-distance runners in overcoming the distance according to the intensity zones, the indicators of functional fitness were at a low level.

Fig 1. Mobile electronic starter



Fig 1. Dynamics of formation of the results of the experimental group of middle distance runners, obtained at the beginning and at the end of the study on physical training

Control exercises	Before the expert.	After the expert.	Difference	%	t	p
100 м (с)	13,01±0,78	12,03±0,75	0,98	7,5	3,62	<0,01
200 м (с)	26,75±1,56	24,57±1,49	2,18	8,1	4,04	<0,001
400 м (с)	55,94±6,12	51,41±5,89	4,53	8,1	2,13	<0,05
600 м (с)	87,3±7,74	81,4±7,16	5,9	6,8	2,24	<0,05
800 м (с)	121,8±13,4	112,4±11,19	9,4	7,7	2,15	<0,05
1000 м (с)	173,2±28,3	153,2±23,8	20,0	11,5	2,16	<0,05
1500 м (с)	258,7±31,2	236,8±26,3	21,9	8,5	2,15	<0,05
3000 м (с)	613,7±71,2	557,1±62,1	56,6	9,2	2,4	<0,05
Long jump from a standing position (cm)	255,0±31,2	281,0±30,2	26,0	10,2	2,4	<0,05
Triple long jump from a standing position (cm)	714,0±75,2	780,0±73,5	66,0	9,2	2,51	<0,05
Ten-quarter long jump from a standing position	2291,0±124	2531,0±123	240,0	10,5	5,5	<0,001

We focused on the results of research on the definition of the starting reaction, we conducted tests to determine the degree of influence of the starting reaction on athletes' sports performance. We studied to what extent the start reaction was formed in the athletes of the experimental group. According to the first study, which involved n=281 athletes, who had the lowest starting reaction - the time taken was 0.405 s. The mean starting reaction time was 0.351 s and the maximum starting time was 0.209 s. The mean athletic performance was 11.74±1.21 s. In the second control test, n=204 athletes participated, the lowest start reaction time was 0.401 s. The average start reaction time was 0.337 s and the high start reaction time was 0.206 s. The average sports performance was 11.80±1.28 s.

In the third control test, the result of the lowest start reaction in n=189 athletes was 0.395 s. The average index of the starting reaction was equal to 0.321 s, and the high index of the starting reaction was equal to 0.201 s. The mean athletic performance was 11.76±1.14 s. In the third stage of pre-competition training, the result of weak start reaction of our student-athletes was 0.398 s. The average starting reaction score was 0.317 s and the high starting reaction score was 0.200 s. The average athletic performance was 11.67±0.97 s. As the training level of our student-athletes developed, it was noticed that the formation of start reaction in them also changes in a positive direction. The reaction time of 24 of our student-athletes was studied during the competition. According to the data obtained, the low reaction time was 0.406 s. The average starting reaction time was 0.321 s and the high starting reaction time was 0.201 s. The average sports result was 11,72±0,85 s. This technique expands the possibilities of selecting athletes at different stages and periods of training, predicting sports results.

It is well known that in long-distance running runners must have a high level of special endurance, which is directly related to functional fitness and requires the performance of loads in aerobic and anaerobic modes of energy supply. There are good reasons why the results of 5000 meter runners look like this. In this case, the distance must be run in predetermined pre-competition intensity zones. If the athlete does not run the distance in predetermined intensity zones tailored to his individual characteristics, physiological abnormalities will appear in his body. First of all, there are changes in the cardiovascular system and respiratory organs. As a result, these changes have a direct impact on the respiratory organs, HR, length and frequency of steps, as well as a decrease in the pace of running, excessive energy expenditure of the athlete in the process of running the distance. And it does not allow them to show a high result.

Conclusion

According to the scientific and methodological literature, scientific studies have been conducted on the management of the training process of athletics athletes at the stages of multi-year training, the development of training components, planning and study of tasks at the stages of multi-year training. In the analyzed works there are different approaches in training athletes. However, scientific research on improving the integrated training of student-athletes is not sufficiently disclosed. In this regard, it is necessary to conduct scientific research on the integrated training of track and field athletes, student-athletes.

While mesomorphic body types are more likely to succeed in short distance running, they have broad shoulders, long legs and well-developed musculature. Middle and long distance runners have narrow waist and well developed hamstrings, broad chest and developed muscles. According to the results of the conducted pedagogical experiment, the athletes' body length was 176.0±1.75 cm, body mass was equal to 72.09±3.37 kg. The result of chest girth study shows that the chest girth at rest is 85.18±3.39 cm, at inhalation - 89.23±3.21 cm, at exhalation - 82.0±3.7 cm. The comparative analysis of the results of the conducted researches showed that our athletes lag behind in the data of physical development by 3,0±0,1 cm. But in other indicators no differences were found.

Therefore, in the process of training it is necessary to teach long-distance runners to master the optimal rhythm of running, to feel the time of overcoming the distance. Moreover, it is necessary to develop an improved training program aimed at improving the functional state of long-distance runners in the conditions of complex training, and scientifically substantiated, to implement it in practice.

“Methodological bases of formation of complex training of short, middle and long distance runners”, a questionnaire survey of training sessions for short, middle and long distance

runners and the distribution of training loads on the subject of ISSPM on the basis of 4-year and 3-year education is presented.

We focused more on the distribution of the correlations between the loads of physical fitness and TFP and functional training of long-distance runners, as a high level of development of physical qualities of long-distance runners allows them to demonstrate effective and economical running technique during competitions and is a factor of effective application of tactics. Taking into account the above factors, we distributed more loads on the development of physical fitness and improvement of functional state compared to other components. The distribution of the 3-year training and education program is presented.

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