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CONTENT OF STRENGTH TRAINING OF MIDDLE DISTANCE RUNNERS AT THE STAGE OF INITIAL SPORTS SPECIALIZATION

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Abstract. *The factors determining the state of efficiency of middle distance runners, include the adaptation of muscles to stress, which manifests as physical endurance. Training aimed at development of endurance, the mode of muscle work, the nature of the developing efforts determine the appropriate transformation in the muscles themselves, which are formed by all content of the training process. In providing the necessary level of development of endurance namely strength training has an important role to play because it is impossible to resolve the problem solely by means of cross-country athletics. From the point of view of experts, intentional use of means of accentuated influence on the neuro-muscular system will improve the sports result. With the aim of identifying features in the content of strength training of middle distance runners in the study was carried out a survey of experts (n = 21), which were provided with a list of 46 physical training means. The content of strength training was examined as well within the context of analysis of the loads of this group of means, developed by runners on average distances at SISS. The study analysed the records of 14 coaches. The results of the analysis have allowed identifying the most frequently used means and methods of strength training of middle distance runners aged 13-15 years.*

Keywords**:** *a stage of initial sports specialization, means, methods, strength training, runners on average distances.*

Introduction

Among the factors determining the state of efficiency of middle distance runners, it is often included the adaptation of muscle to stress, which manifests such physical quality as endurance. According to many authors, the development of this quality will not only contribute to improving the system of oxygen transportation to the muscles, but also cause changes that are directly related to its more full utilization [1, 2, 7, 9, 10, 14 etc.].

At the same time specialists admit the need for adaptation of muscles in middle distance runners to adequate or excess effects according to their efforts that they manifest in terms of competitive activities [4, 11, 19, 20].

In general terms this thesis is reflected in the works of F. Suslov: Improving the strength component … leads to increasing the capacity of the working effort, the formation of a rational phase of structure of movements, to optimal combination of frequency and length of steps. ... improvement of elastic and reactive properties of muscles and their ability to recuperation of mechanical energy ..., which increases the efficiency of functioning of muscular system [21, 22, etc.].

As one of the main directions in the implementation of this statement experts point to the need to improve strength training, because mainly intentional impact on the neuromuscular apparatus of athletes naturally entails positive changes at the level of their sports skills [11, 19].

Thus, the authors agree that the contractile and oxidative properties of the muscles of the athlete can to a large extent determine his motor capabilities, while the remaining physiological systems of the body functionally support and provide the required level of muscle activity [3, 4, 7, 8, 11, 19, 20, 21].

This point of view is shared by V. Sirenko [20, p. 68], stating that when exercise is primarily aimed at the development of endurance the mode of muscle work, nature of developed efforts determine the appropriate transformation in the muscles, which are formed by means of all the content of the training process.

He notes that the means of strength training can play an important role in providing the necessary level of development of endurance in middle distance runners, because it is impossible to resolve the problem solely by means of cross-country athletics. Consequently, the purpose of their strength training is to achieve by runners high-level strength endurance, i.e. the ability to multiple manifestation of required val-

ue of motor efforts. The formation of this ability is primarily related both with an increase of a power component of movement and the ability to perform prolonged physical activities, maximizing the aerobic way of energy movement action, as well as recuperation of energy of muscles, i.e., energy of elastic deformation of muscles [4, 20].

Interest to this approach in the training of middle distance runners arose because it became evident that the exhaustion of reserves of an extensive way of increasing their fitness by means of increasing the volume of training loads, due to the limitations of "gross" reserves of the human body, associated mainly with the impossibility of timely replenishment of energy and plastic resources. Therefore experts agree that further enhancement of athletic performance, largely associated with the search and introduction into the training process more effective and more specific means of influence. To the latter professionals often refer effects from the collection of strength training means, because from their point of view, the purposeful use of means of accentuated effect on the neuro-muscular system contributes to the increase in sport performance [3, 4, 8, 11, 19, 20, 21 etc.].

It should be noted that in recent decades the importance of strength training for increasing a special capacity in middle distance runners is not called into question. The use of training tools of strength orientation has become commonplace. At the same time there is a reason to say that the above is relevant only to the process of preparation of the runners of high qualification. The opinions of experts about the use of means of the group in training young athletes is not so clear [8, 13, 15, 17, 18, 23 etc.]. As a result the place of means of strength training in the structure of the training impact is causing some interest, which are developed by young runners on average distances and their impact on the growth of sportsmanship.

Methodology and research organization

Given that specialists-practitioners in most cases pay significantly less attention to technical-tactical training of middle distance runners than the physical one, it is of particular interest is the knowledge about the tools of training methods they use from the arsenal of the latter. In consequence of this study an attempt was made to get the information of interest, by interviewing experts (n = 21) on this issue. In this regard, respondents were presented a list of means of physical training (n = 46) recommended to use by runners on average distances on SISS (the stage of initial sports specialization) [4, 8, 18, 19, 20]. The list represented a wide range of tools with different focus. The respondents in the study involved practitioners, including coaches: II category -3; I category -7; the highest category – 11. The composition of respondents included 4 of the Deserved trainers of the Republic of Moldova. The survey was conducted in February-March, 2009.

It should be noted that in special literature, quite often, there are discrepancies in relation to the age range of people involved at various stages of their long-term training [13, 15, 17, 18, 22, 23]. Considering the opinions of experts, as well as objectively existing fuzzy of temporal boundaries between stages, as a guide to explore the content of strength training in middle distance runners on SISS, was adopted the age of 13-15 years.

The results of the study and their discussion

According to the results of a study, from the arsenal of training means, recommended by experts for use in training middle distance runners on SISS, respondents, as a rule, apply in practice 71,5 %. Further differentiation of sample on the basis of prior use of this group of means in one or another area of power supply, we were allowed to reveal their correlation.

The results of the study indicate a fairly wide variety of tools used in the training process of young runners both in aerobic-anaerobic (53,3 %) and anaerobic (41.7%) areas of power supply, and a narrow range of application of aerobic orientation (7,0 %). It should be noted that the detected ratio of training means should not mislead the experts, because it reflected only the preferences of respondents in relation to the di-

versification of exercises used with the purpose of improving the mechanisms of energy supply of muscular work.

In the context of the problem discussed, the knowledge about the peculiarities of the content of power training of young middle distance runners acquire great importance. In the presented to respondents a list of training means was also included the block of means of strength orientation (n = 29). It should be recalled that their use in training middle distance runners on SISS caused for quite a long time the fundamental differences among experts, defending different points of view in regard to the appropriateness of their use in practice [8, 15, 17, 18, 23 etc.].

It was considered that the effectiveness of the system of preparation of runners on average distances was connected with the development and improvement of features of the oxygen transport system [1, 2, 10, 14, 22 etc.]. However, the results of several studies indicate that the running capacity of the muscular system plays a less significant role in getting the athlete on the predicted level of sports achievements. It was found that the muscular components act as a determining factor, purposefully influencing on which you can achieve a significant increase in motor potential of the runner and ensure his efficient performance in terms of competitive activity than in the framework of using traditional means of training [4, 20, 19 21, etc.].

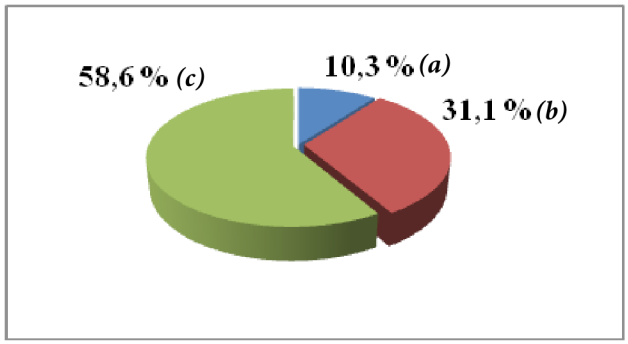
Unfortunately, this view is not adequately reflected in the guidelines, dedicated to training young middle distance runners. Moreover, it continues to be considered that the use of the means of strength orientation in training young middle distance runners has a negative impact on the condition of their musculoskeletal system, on the one hand, and on the other, has only indirect influence on the growth of sporting achievements in the form of athletics, in connection with which their use is not advisable.

Despite its declared unpopularity of use of exercise of strength nature in training process of young middle distance runners, they were well represented in the arsenal of training means used by trainers.

As confirmation of the above here are the survey results that indicate that 100,0 % of the respondents, in varying degrees, but use the means of strength orientation in the training process of their pupils.

Based on the conditions, nature and magnitude of the manifestations of muscular efforts, the strength ability is accepted to classify on the basis of the forms of their motor manifestations. In the most simplified form they can be differentiated on the proper strength and speed-strength abilities and strength endurance [3, 6, 16, 19, 20, 22 etc.].

In accordance with this classification, the means of strength training are also usually differentiate. Consequently, the differentiation of means of strength orientation made in the study was focused on the above classification. The results of this analysis are presented in Figure 1.

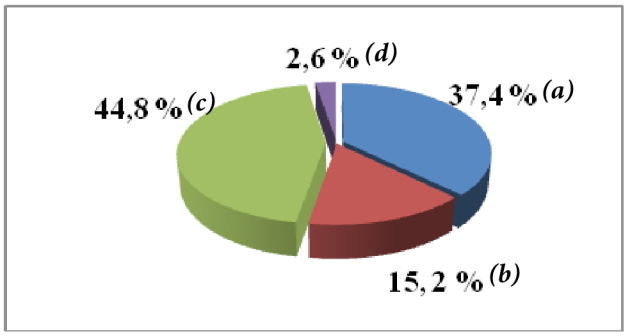


Conventional signs: a – proper strength, b – speed-strength, c – strength endurance

Fig. 1. The ratio of training means aimed at the development of different forms of motor manifestations of strength abilities in training middle distance runners aged 13-15 years,%

According to the results of the analysis, the means directed to the development of strength endurance are used the most in training of middle distance runners (58.6%), and least of all - developing proper strength abilities of young athletes (10.3%). The results obtained in the course of the study do not point to the importance of a

group of means, but merely state the fact of their correlation.



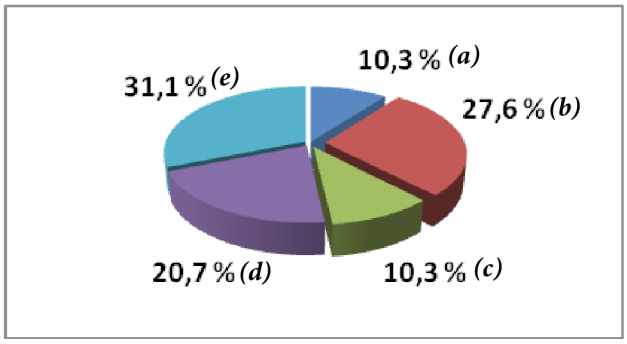
Conventional signs: a – anaerobic-alactate area, b – anaerobic-lactate area, c – aerobic-anaerobic area, aerobic area

Fig. 2. The ratio of means of strength training in the area of energy supply in training middle distance runners aged 13-15 years,%

Differentiation of the complex of means of strength training of middle distance runners performed on the basis of preferential use in different areas of energy supply, allowed to reveal their correlation, which largely coincides with the data previously obtained during a similar analysis of the means chosen by respondents from the initial list. In both cases, preference is given to means that are performed in mixed and anaerobic-alactate areas of energy supply. "Poorer" is presented the arsenal of means used in the aerobic area of energy supply. A coincidence is observed in an effort to reduce to a minimum the use of means of glycolytic zone of energy supply (Figure 2).

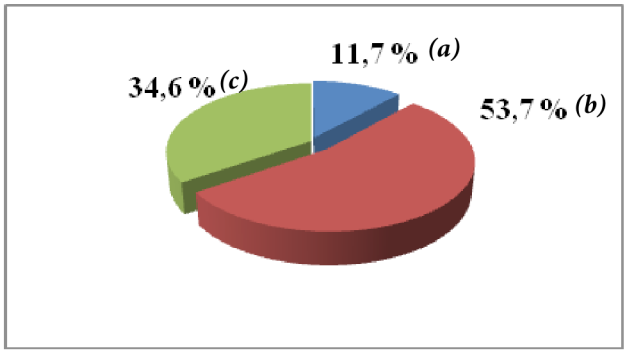
The above classifications of means of strength training are not quite convenient in practice to differentiate the exercises aimed at the development of various forms of musculoskeletal manifestations of strength abilities. Consequently, the study used a different classification of this group of means. The results of its use are presented in Figure 3.

The use of this approach allowed to establish that in weight training of young middle distance runners, the preference is given to means aimed at the development of strength and speed-strength motor manifestations of endurance (51,8 %) and speed–strength abilities (27,6 %) developed with an emphasis on speed component. To the less degree are applied the proper strength exercises as well as speed strength ones, which are used in practice to increase the strength component of movement (up 10.3 %).



Conventional signs: a – proper-strength; b – speed-strength with emphasis on high-speed component; c – speed-strength with emphasis on power component; d – speed-power with emphasis on endurance; e – strength endurance.

Fig. 3. The ratio of training means aimed at the development of various forms of musculoskeletal manifestations of power capabilities in middle distance runners aged 13-15 years, %

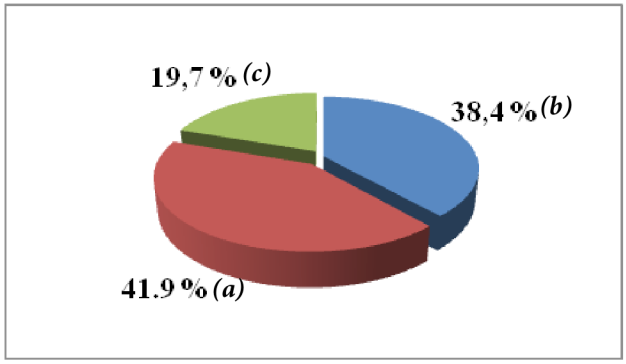


Conventional signs: a – repeated; b – repeated-serial; c – circular

Fig. 4. The ratio of training methods used to develop proper strength capacities in middle distance runners on SISS, %

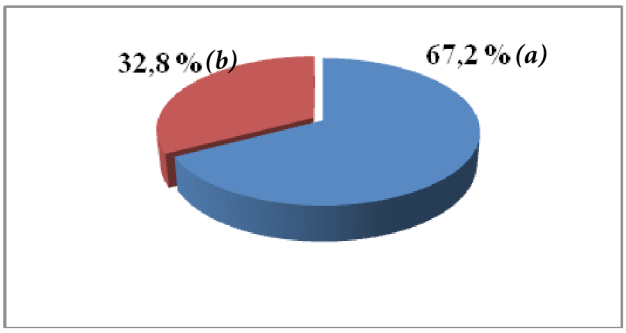
Researching the content of strength training of young runners it is impossible not to mention methods that determine the focus used for this purpose effects. In this regard, respondents were offered a list of methods recommended for use in the implementation of the tasks of strength training of middle distance runners. The list included the following methods: shock; dynamic efforts;

repeated-serial; interval; conjugate; variable; repeated; circular. The results of the analysis are presented in Figures 4-8.



Conventional signs: a – repeated-serial; b – interval; c – circular

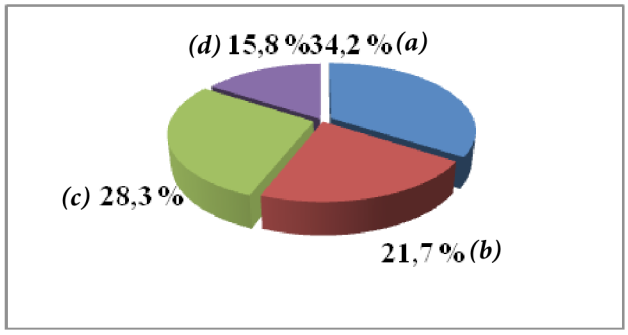
Fig. 5. The ratio of training methods used to develop strength endurance in middle distance runners on SISS, %



Conventional signs: a – repeated-serial: b – interval

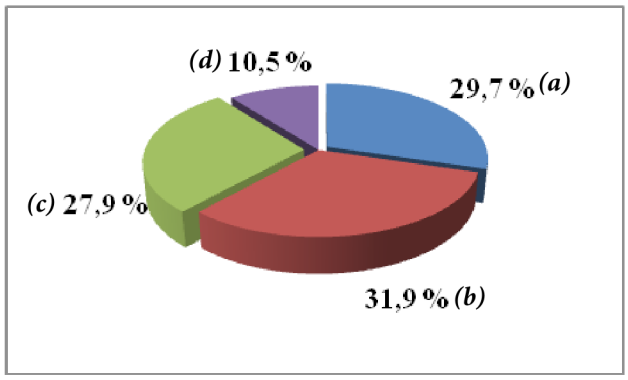
Fig. 6. The ratio of training methods used to develop strength endurance in middle distance runners on SISS, %

According to the results of this analysis, the application of the above methods is mostly legitimate. However, in the case of proper-strength abilities the use of circular method is not always justified, since this method is generally regarded by experts as one of the varieties of interval method used for any other purpose. It should be noted that the most popular method used among trainers in strength training is a repeated-serial method (43,3%) and shock (5,3%) - the least. Other methods vary in the range of 10.8 to 14.2 %. Depending on the need of development of a particular form of motor manifestations of power the demand of methods is changing. It should also be noted that respondents tend not to use conjugate and variable methods.



Conventional signs: a – repeated; b – repeated-serial; c – dynamic efforts; shock

Fig. 7. The ratio of training methods used to develop speed-strength endurance developed with the emphasis on speed component in middle distance runners on SISS, %



Conventional signs: a – repeated; b – repeated-serial; c – dynamic efforts; d – shock

Fig. 8. The ratio of training methods used to develop speed-strength endurance developed with the emphasis on strength component in middle distance runners on SISS, %

In the aspect of studying the content of strength training of middle distance runners there is a natural interest in training loads of this group of means, developing them on SISS. With this aim, the study analysed the records of 14 coaches, practicing the training of athletes of this specialization. These studies are presented in Table 1.

The comparison of the results of a survey of experts on the question of the content of strength training, differentiated by areas of energy supply

and its preferential orientation on the one hand, and on the other, data analysis, training loads, suggests that proportions revealed have no significant differences. The obtained results may also be evident of the correctness of the approach taken as an instrument of the research.

Table 1. The ratio of means of strength character by areas of energy supply and signs of primary focus, %

№	The analysed parameters	Survey data of coaches	Data of analysis of training loads
	Energy supply areas	100	100
1	Anaerobic-alactate	37,4	35,5
2	Anerobic-lactate (glycolytic)	15,2	16,7
3	Anaerobic-aerobic (mixed)	44,8	45,8
4	Aerobic	2,6	2,0
	Primary focus	100	100
1	Proper strength capacity	10,3	11,8
2	Speed-strength capacity	37,9	36,6
3	Strength endurance or LME	51,8	51,6

As expected, the effects aimed at the development of strength endurance (51.6 %) dominate in the structure of training loads of strength nature. At least significantly loads were mastered in means aimed at the development of speed-strength (36.6%), and the proper strength (11,8 %) abilities. The study of the structure of loads, differentiated by areas of energy supply, to a certain extent, reflects the ambition of coaches to minimize the use of means of strength training in a glycolytic mode (16.7 %). It should be noted that the bulk of the loads of this group of means is done in an anaerobic-alactate and mixed areas of energy, respectively 35,5 and 45.8 %. The assertion is reckless that certain forms of motor manifestations of strength abilities develop only within any one zone of energy supply. Despite the fact that the guidelines sometimes include such practical instructions, it is quite natural that in this case the question is about the exercises in traditional modes, and not about limiting the range of applications of a particular area.

For this observed discrepancy can be quite subjective in nature, because not all respondents can see differences between the means of training and motor tasks, and thus do not take into account the effect of their performance through various methods. This fact would allow, though not essential, but to change the structure of the content of strength training, not according to the complex of its means, but to their primary focus. At the same time, the results of the study give grounds to speak of a sufficiently high degree of objectivity of the obtained data.

Conclusions

It was considered that the effectiveness of the system of training of runners on average distances is due solely to the improvement of the oxygen transport system. At the same time, the results of studies in recent decades show that the capacity of the muscular system plays no less significant role in getting the athlete on the predicted level of sports achievements. It is founded that accentuated effect on the muscle component of the athlete allows achieving more significant development of its motor capacity and a more efficient implementation of the latter in terms of competitive activity than when using traditional means of training. However, the importance of strength training to increase the level of special capacity in middle

distance runners is not questioned only in relation to highly skilled athletes. In relation to the use of the group in the training process of young athletes, the opinions of experts are not so clear.

The data obtained indicate that 100% of coaches use in training young runners the means of strength nature. Preference is given to means applied in mixed and lactate areas of energy supply. It is identified the ambition to reduce the use of means of glycolytic nature to the level of necessity. It is established that in strength training of young runners the preference is given to means aimed at the development of strength and speed-strength motor manifestations of endurance (51,8 %) and speed–strength abilities (27,6 %) developed with an emphasis on speed component. At least the proper strength and speed–strength exercises are used to increase the strength component of motion (10,3 %). The most popular part of strength training used to repeated-serial method (43,3 %), and impact the least (5,3 %). Other methods vary in the range of 10,8 to 14,2 %. Analysis of the structure loads of strength character allowed to reveal the dominant role of actions aiming at the development of strength endurance (51,6 %). Part of loads in means aimed at the development of speed-strength and proper-strength capabilities were equal to 36,6 and 11,8 %. In the structure of loads, differentiated by areas of energy supply, also reflected the ambition of coaches to minimize the use of means of strength training in a glycolytic mode (16,7 %). The bulk of the loads of strength character was developed in the anaerobic-alactate and mixed areas of energy, respectively 35,5 and 45,8 %.

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