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Multi-Year Training Load Structure in the Sprinter Training System

Sergey V. Skrygin[1], Alexander L. Yurchenko[2], Oksana G. Zhigareva[3] and Alexander S. Sidorov[4]

[1]Financial University under the Government of the Russian Federation, 49 Leningradsky Prospekt, 125993, Moscow, Russia.

[2]Financial University under the Government of the Russian Federation, 49 Leningradsky Prospekt, 125993, Moscow, Russia.

[3]Financial University under the Government of the Russian Federation, 49 Leningradsky Prospekt, 125993, Moscow, Russia.

[4]Financial University under the Government of the Russian Federation, 49 Leningradsky Prospekt, 125993, Moscow, Russia.

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ABSTRACT

The research addressed the task of building a multi-year training load structure for short-distance runners. In the course of the work, advanced practical experience was generalized, scientific and methodological literature was analyzed, and statistical data processing methods were used. The article hypothesized that the creation of a multi-year training system of sprinters based on the gradualness and succession principle is possible with the integrated use of results of scientific and experimental activities of the authors, who published their recommendations separately for beginners and qualified athletes. The integrated use of the data available in the scientific literature will make it possible to reduce the subjective influence and to designate an objective trend for more effective management of the multi-year training process for sprinters. The research work result is the multi-year training load structure for training the short-distance runners.

Introduction

The sprint is one of the most complicated athletic disciplines in terms of achieving the maximum result. That's why the sprint is rated among the most popular and spectacular kinds of the track and field athletics. The issues of setting up the records and personal achievements actualize the efforts made by coaches, athletes and scientists, they stimulate the searches for new pedagogic approaches, loads and technical capacities (Ustinov ,2012; Kawamori & Haff, 2004). The cases were noted when the innovation ideas and the efforts made by coaches do not yield positive results. It is known that the methods and methodologies were used that ensure the results growth, but, in the future, the athletes have to pay for these results with their short sporting career and their own health.

A forced load method is one of such inventions. This method consists in application of great volumes of any high-intensity exercises in a short period of time, as a rule, at a phase of insufficient revival of the athlete (Huxley *et al.*, 2014; Carey *et al*, 2017). Specialists know well that such an approach for achieving a desired result and satisfying the coach's ambitions is injurious to the athletes' health as well as deprives the young people of sporting and just healthy longevity.

The forced intensification of the training process and the received "immediate results" have the seamy side too. An artificially-created but untimely success distorts the natural processes of the athlete's organism. The forced loads have a pernicious effect on the runners' organs and systems at the beginning of their sporting career and, particularly, in the period of its end (Cross *et al*, 2018; Halson, 2014). These facts became well-known because not only the coaches' community faces a regularity that can be formulated in the following way: concentration of the high-intensity training loads in a relatively short period of time makes it impossible for an athlete to fully recover his or her strength, favors the accelerated wear of human organs and systems and the premature disablement. Apart from that, pursuit for the result does not give any time and chances for the scientifically-substantiated principles of more humane athletic training to be implemented (Stöggl & Sperlich, 2015; Collette *et al*., 2018).

It is no secret that the athletes' training is a multifaceted and complicated process. The process must take into account and use the fundamental standards of the human vital functions. The general and special physiological regularities of the sporting training are an important subject of the scientific research. The qualitative conclusions on this issue help to make the pedagogic process more efficient. In the methodic literature, such regularities are represented in the form of specific principles. The principles of "consciousness and activity"; "individuality" and "systematicness"; "gradualness" and "succession" are characteristic for the physical training to the maximum extent. All the listed principles are applicable for the training process. The principles of "consciousness and activity"; "individuality" and "systematicness"; "gradualness" and "succession" are characteristic for the physical training to the maximum extent. All the listed principles are also applicable for the training process. However, among them the authors propose mentioning such principles that are of primary importance. The authors believe that the "gradualness" and "succession" principles determine a success of a multi-year system of training the highly qualified athletes. In the first instance, the both principles are an indispensable condition of competent planning of the multi-year special sporting training. It is no secret that development of various systems of the organism under the influence of training loads must be implemented for a long time gradually and in successive order.

It is impossible to decrease the importance of the training principles in question. If these are high and stable sporting results, the success is determined, in a greater degree, by the physical loads that must be increased gradually with account taken of age and a level of the organism's physical readiness. The training influence measures are in direct relationship to volumes and intensity of the exercises used. It is the volume and intensity that determine the permissible, necessary or excessive loads (Cross et al, 2018). The measure, which exceeds the adaptive capacities, makes the athletes' organisms work in an extreme mode. A regular use of the excessive loads destroys the basis of the fundamental training level and poses a threat to the athletes' health.

In the children and youth sports, inadequate loads can have destructive effect for several reasons. Firstly, the processes of making the basic functions of a young organism are violated or hindered. Secondly, a regular use of the training loads beyond the organism's adaptive capacities does not allow the young athletes to reach maturity and to fully implement their own talents and aptitudes.

The sprint is one of the outstanding representatives of the youth sports, where the high-intensity loads are used frequently. The trainings in this kind of the track and field athletics are notable for great tension of many systems of the organism. In the children and youth sprint, quantity of the damaging and aggressive factors increases as the race intensity and the high-intensity exercises volume increase. As a result, the psychic and physical tension exceeds permissible standards, which makes many systems of the organism work in an extreme mode during the competitions as well as the trainings. It may be said that during the sprinters training, several kinds of too heavy loads are used. Each of them, in its own measure, creates the prerequisites for traumatization, illnesses or overtraining (Kawamori *et al*., 2014; Zhigareva *et al*., 2019; Foster, 2019).

The "gradualness" and "succession" principles imply a more adequate increase in the volume and the intensity of training loads during the whole multi-year training system. That's why the pedagogic technology, which is based on the gradualness and succession, must be expressed in specific units. An initial level of the numerical concretization is a volume of the applied training loads. The volume, which increases gradually and in in successive order, must correlate with standardized time intervals. In the scientific literature these intervals are designated by cycles. For successful prospective planning, in the first instance, it is necessary to determine volumes of the training loads in annual training cycles from a beginner to a highly qualified athlete (Foster *et al*., 1998).

On the basis of the theses represented, the research for detecting a rational structure of the training loads is important, since it ensures a more full-fledged implementation of talents and faculty of young runners in their sporting career. Apart from a career, it is important for coaches to see to keeping the physical and psychic health of the athletes-beginners (Collette *et al*., 2018)..

The specialists sort out two kinds of consequences of using the loads, whose intensity exceeds the adaptive capacities: short-term and long-term consequences under the influence of an extreme factor with a striking effect (Yurchenko *et al*., 2018; Mirzoev, 2000). Apart from the short-term and long-term consequences, distant chronic violations, which restrict the motion activity and the ability to work, can appear. Thus, the research of permissible volumes of the training loads becomes important and timely.

The research goal is to determine an annual volume of the training loads in the multi-year system of the sprinters training with the use of the gradualness and succession principle.

In order to achieve the goal in view, it is necessary to solve the following tasks in the paper:

1.To determine an initial level of the training loads, whose magnitude is safe for the athletes-beginners' health To determine the maximum value of the training loads volume, which corresponds to a level of readiness of the highly qualified sprinters.

2.What teacher cognition constructs do teachers reveal toward the communicative aspect of IELTS Preparation courses?

3.To calculate, by the mathematical statistics method, a trend line as the training loads increase from the beginner to the master of sports.

4.To determine, on the base of the trend line, by the extrapolation method, a structure of the training loads for the 2nd and the 1st grades athletes of, and for the candidates for master of sports.

5.To build a multi-year structure of the training loads for sprinters from the beginner to the master of sports.

Method

The article analyzes the existing developments and scientific-practical recommendations aimed at improving a system of training of the sprinters with different sporting qualification.

The authors hypothesize that the training process efficiency is determined by rational, specially calculated structured multi-year volumes of the training loads.

In order to confirm this information, this research was carried out. The assigned tasks were solved on the basis of an analysis of the specialized scientific methodological literature and generalization of the practical work experience results.

The scientific methodological literature has results of two pedagogic experiments (Bompa *et al*, 2019; Mirzoev, 2005). The first research determined the training load volumes for the athletes-beginners (Yurchenko *et al*, 2018). The second research established the training load volumes for the highly qualified athletes. A trend line was built between the numeric values of these two experiments (Skrygin, 1992; Ivanov, 1990; Zhigareva *et al*. 2019). With the use of the

extrapolation method, specific magnitudes of the training load volumes for the 2nd and the 1st grades athletes and for the candidates for master of sports were received.

Results

According to the results of the research work, the data, which was represented in Table 1, was received. The data fills the multi-year structure of the training loads from the athlete-beginner to the master of sports. The main advantage of the design developed is observation of the principle of gradual and successive increase in the training influence. All the training loads, which are represented in Table 1, are tested, approved and recommended for the use in building a rational load volume. The rationality concerns the load magnitude as well as the ratio of quantity of the exercises of different purposes for the runners-beginners, for the 2nd and the 1st grades athletes, and for the candidates for master of sports and more qualified sprinters (see Table 1).

Table 1. *Ratio of training loads for the 3rd grade athletes*

Training loads	**Annual volume of the training loads for the 3rd grade athletes (in units of the total volume)**
Less than 80-meters race at a speed of 96-100% (out of max.)	14.8±1.8
100-300-meters race at a speed of 91-100% (out of max.)	20.0±2.6
100-300-meters race at a speed of 81-90 % (out of max.)	17.7±2.4
More than 300-meters race at a speed of 80% (out of max.)	105.6±3.1
Weight exercises (t)	33.5±3.2
Jump exercises (out of ∗ 100%)	7700±109

Source: The table is drawn up by the authors according to the research results.

On the basis of the experimental data analysis in Table 1, it may be noted that the training process is aimed at the general physical training and the study of the sprint technique. The initial training stage tasks consist in the locomotive system strengthening through the jump work and the general weightlifting exercises (Balsalobre-Fernandez et al., 2015; Støren, 2008; Blagrove, 2018; Lockie ,2017). The special training task for the athletes-beginners consists in the development of the quickness and technique of the maximum-intensity race. Priorities of the initial training stage are the basic physical and technical training; the locomotive system strengthening.

The listed aspects of the training work in the sprinters-beginners program require an observation of the following ratios of the loads of different purposes: general physical training – 30%, technical training – 30 %, exercised for training the locomotive system for the sprint – 15%, exercises for improving the general endurance – 20%, special race training – 5 % out of the amount of time spent for the training over a year.

Thus, the training load structure for the sprinters-beginners is mainly aimed at technical and general physical training. The specialized exercises volumes are planned with the minimum value (see Table 2).

This ratio of the exercises of different purposes excludes the possibility of forced influence on the young athletes' organisms (Rumpf, 2012).

Table 2. *Ratio of training loads for the 2nd grade athletes*

Training loads	**Annual volume of the training loads for the 2nd grade athletes (in units of the total volume)**
Less than 80-meters race at a speed of 96-100% (out of max.)	16.4±2.4
100-300-meters race at a speed of 91-100% (out of max.)	22.7±3.2
100-300-meters race at a speed of 81-90 % (out of max.)	22.6±3.1
More than 300-meters race at a speed of 80% (out of max.)	117.4±4.1
Weight exercises (t)	63.3±5.0
Jump exercises (out of ∗ 100%)	8870±126.7

Source: The table is drawn up by the authors according to the research results

The training load structure of the 2nd grade athletes has a number of specific features. The structure is characterized by the fact that, unlike the athletes-beginners, the maximum-intensity race volume at the sections of up to 80 meters grew to 16.4 kilometers. This volume grew by 11%. For the athletes with this qualification, it is necessary to increase the annual race volume with the maximum speed at the sections of from 100 to 300 meters by 2.7 kilometers, the race volume at the sections of from 100 to 300 meters at the submaximum speed – by 5 kilometers, and the race quantity at the sections of more than 300 meters at a speed of less than 80 % out of the maximum – by 21.8 kilometers. The listed exercises volumes increase in comparison with the initial training stage by 13.5%, 28% and 11.2%, respectively. To develop strength, the sprinters of the considered qualification group must use the weight exercises for sprinters. Such a kind of the training load is equal to 63.3 t for the annual training cycle, which makes up almost 90% of a growth of the plan of the 3rd grade athletes (Healy *et al*., 2019). Apart from the listed training loads, it is important to use the jump exercises in the volume of 8870 jumps-off during the year, which exceeds a training load of the same purpose of the athletes of the previous qualification group by 15.2%.

In the training load structure for the 2nd grade sprinters, it may be noted that the training process is aimed at an initial level of specialization at a competitive distance. General training tasks are the locomotive system strengthening through the jump work and an increased volume of the combined developing exercises. Special training tasks consist in implementation of the muscle strength potential, which was acquired in the preparatory period, in the competitive distance race and the speed endurance development (Bompa *et al,* 2019; Issurin, 2010). The training priorities for the 2nd grade runners are the technical training and the initial specialization level.

The listed aspects of the training work in the 2nd grade sprinter program must have the following ratio: 25% is allotted for the general physical training, 25% is allotted for the technical training, 20% is allotted for exercises for strengthening the locomotive system for the maximum-intensity race, 25% is allotted for improving the general endurance, 5% is allotted for the special race training out of the amount of time spent for the training over a year.

Thus, the training load structure of the second stage of the athletic improvement is mainly aimed at the technical and general physical training with the initial specialization elements. The represented ratio of exercises of different purposes makes it possible to come to the sporting specialization stage in a flexible manner and without detriment to the health (see Table 3).

Table 3. *Ratio of training loads for the 1st grade athletes*

Training loads	Annual volume of the training loads for the 1st grade athletes (in units of the total volume)
Less than 80-meters race at a speed of 96-100% (out of max.)	18±2.9
100-300-meters race at a speed of 91-100% (out of max.)	25.5±3.7
100-300-meters race at a speed of 81-90 % (out of max.)	27.7±3.8
More than 300-meters race at a speed of 80% (out of max.)	129.2±5.1
Weight exercises (t)	93.2±6.8
Jump exercises (out of ∗ 100%)	10000±144.1

Source: The table is drawn up by the authors according to the research results.

The training load structure of the 1st grade athletes acquires the regularities that are different from two earlier-considered designs. It is characterized by the fact that the maximum-intensity race volume growth at the sections of up to 80 meters made up 1.6 kilometers. Increase in this kind of a load loses momentum and makes up only 11%. For athletes of this level of qualification, it is necessary to increase the annual race volume at the maximum speed at the sections of from 100 to 300 meters to 25.5 kilometers, the race at the sections of from 100 to 300 meters at the submaximum speed up to 27.7 kilometers, and the race at the sections of more than 300 meters at a speed of less than 80 % out of the best possible result to 129.2 kilometers. The listed exercises volumes grew in comparison with the previous training stage by 12.3%, 22.6% and 10.1%, respectively. To develop strength, the sprinters of the considered qualification group must use the weight exercises in the volume of 93.2 t. for the annual training cycle, which makes up almost 47.2% of the growth out of the training plane of the 2nd grade athletes. Apart from the listed training loads, it is necessary to use the jump exercises in quantity of 10000 jumps-off during the year, which exceeds the training load of the same purpose of the athletes of the previous qualification group by 12.7%.

When considering the training load structure for the 1st grade sprinters, it may be noted that the main goal of the training process determines the improvement of the technical skills and physical capacities for qualitative covering of the competitive distance as the priority aspect. The general training tasks consist in the locomotive system development through the jump work and an increased volume of the combined developing exercises. The special training tasks are the technical skills improvement, the increase in average speed of covering the competitive distance, and the speed endurance improvement. The training priorities are as follows: physical and technical training; special race training to increase the race speed and the speed endurance; formation of the athletes' ability to perform the instantaneous tension with the quickest possible relaxation of muscles during the race.

The training loads in the 1st grade sprinter training structure must have the following ratios: general physical training – 20%, technical training – 20%, exercises for developing the locomotive system for the maximum-intensity race – 25%, exercises for improving the general endurance – 20%, special race training – 15% out of the amount of time spent for the training over a year.

Thus, the training load structure for the 1st grade runners is mainly aimed at improving the special skills of covering the competitive distance. This stage of the sporting improvement comprises the in-depth specialization beginning (Anthony *et al.*, 2012)29].

The training load structure of candidates for master of sports acquires specific features for the qualified athletes (see Table 4.)

Table 4. *Ratio of training loads for candidates for master of sports*

Training loads	Annual volume of the training loads for the candidates for master of sports (in units of the total volume)
Less than 80-meters race at a speed of 96-100% (out of max.)	19.6±3.5
100-300-meters race at a speed of 91-100% (out of max.)	28.2±4.3
100-300-meters race at a speed of 81-90 % (out of max.)	32.7±4.5
More than 300-meters race at a speed of 80% (out of max.)	141±6.1
Weight exercises (t)	123±8.5
Jump exercises (out of ∗ 100%)	11200±161

Source: The table is drawn up by the authors according to the research results

The training load structure of the candidates for master of sports acquires specific features of the qualified athletes. It is characterized by the fact that the maximum-intensity race volume growth at the sections of up to 80 meters made up 1.6 kilometers, which is 9.8%. Further increase in this kid of a load loses its sense, since the training process goal is changed. For the athletes with this qualification, it is necessary to increase the annual race volume at the maximum speed at the sections of from 100 to 300 meters in comparison with the previous stage load by 2.7 kilometers, the race at the sections of from 100 to 300 meters at the submaximum speed – by 5 kilometers, and the race at the sections of more than 300 meters at a speed of less than 80 % out of the best possible result – by 11.8 kilometers. The listed exercises volumes increased by 10.5%, 18.1% and 9.1%, respectively. To develop strength, the sprinters of the considered qualification group must use the weight exercises in the volume of 123 t for the annual training cycle, which makes up 32% of growth out of the training plan of the 1st grade athletes. Apart from the listed training loads, it is necessary to use the jump exercises in quantity of 11200 jumps-off over a year, which exceeds the training load of the same purpose of athletes of the previous qualification group by 12% (Sarabia, 2017).

When analyzing the data received, some peculiarities may be noted. Firstly, the training process is aimed at improving the technical skills and functional capacities for enhancing the maximum result at the competitive distance. The general training tasks are to build up the functional potential of the locomotive system. The special training tasks are to improve the technical skills, to increase the average speed of covering the competitive distance and to improve the speed endurance. The training priorities are the in-depth specialization in a selected kind of the sprint.

The training loads in the springer program of the candidates for master of sports must have the following ratios: general physical training – 15%, technical training – 20%, exercises for developing the locomotive system capacities for the maximum-intensity race – 25%, exercises for improving the general endurance – 10%, special race training – 25% out of the amount of time spent for the training over a year.

Thus, the training load structure for the runners-candidates for master of sports is mainly aimed at deepening the specialization in all the training spheres, on which the competitive distance result depends (see Table 5).

Table 5. *Ratio of training loads for masters of sports*

Training loads	Annual volume of the training loads for the masters of sports (in units of the total volume)
Less than 80-meters race at a speed of 96-100% (out of max.)	21.2±4.1
100-300-meters race at a speed of 91-100% (out of max.)	30.9±4.8
100-300-meters race at a speed of 81-90 % (out of max.)	37.7±5.2
More than 300-meters race at a speed of 80% (out of max.)	152.8±7.1
Weight exercises (t)	168.8±10.3
Jump exercises (out of ∗ 100%)	12400±179

Source: The table is drawn up by the authors according to the research results

The training load structure of the highly qualified athletes is characterized by the fact that the maximum-intensity race volume growth at the distances of up to 80 meters in comparison with the structure of candidates for master of sports made up 8%. For the athletes with this qualification, the annual race volume at the maximum speed at the sections of from 100 to 300 meters must make up 30.9 kilometers. This figure is by 2.7 kilometers more than planned at the previous stage of the sporting improvement. The annual race volume at the sections of from 100 to 300 meters at the submaximum speed increases by 5 kilometers, and the race at the sections of more than 300 meters at a speed of less than 80% - by 11.8 kilometers. The listed race exercises volumes increased in comparison with the previous training stage by 9.6%, 15.3% and 8,4%, respectively. To develop strength, the sprinters of the considered qualification group must use the weight exercises in the volume of 168.8 t for the annual training cycle, which makes up almost 37% of the growth out of the training plan of the candidates for master of sports. Apart from the race and the strength load, it is necessary to use the jump exercises in the volume of 12400 jumps-off during the year, which exceeds the training load of the athletes of the previous qualification group by 10.7%.

When analyzing the data, which was received during the research, it is possible to say that the training process is aimed at preserving the quality of sporting results during the optimum period of time until the signs of destructive phenomena in the organism appear. According to the results of the research conducted, it is possible to recommend the following training load structure in the multi-year system of the highly qualified sprinters training (see Table 6).

Table 6. *Structure of multi-year training loads of sprinters of different qualification*

Training loads	Grades			Candidate for Master of Sports	Master of Sports
	3	2	1		
Less than 80-meters race at a speed of 96-100% (out of max.)	14.8	16.4	18	19.6	21.2
100-300-meters race at a speed of 91-100% (out of max.)	20.0	22.7	25.5	28.2	30.9
100-300-meters race at a speed of 81-90 % (out of max.)	17.6	22.6	27.7	32.7	37.7
More than 300-meters race at a speed of 80% (out of max.)	105.6	117.4	129.2	141	152.8
Weight exercises (t)	33.5	63.3	93.2	123	168.8
Jump exercises (out of ∗ 100%)	7700	8870	10000	11200	12400

Source: The table is drawn up by the authors according to the research results.

The training tasks of the multi-year sprinter training system are to preserve the achieved magnitude of the maximum speed on the whole competitive distance. The training priorities are to extend the sporting career time; to gradually reduce the training process tension; to finish the competition performances reasonably (Daley *et al., 2007; Ross et al., 2001)*.

Discussion And Conclusion

Discussion of the research results according to peculiarities of changing the trading load volume of different purposes in the multi-year training structure of sprinters

In the final research part "discussion of the results", it is necessary to pay attention to the dynamics by kinds of the training loads in the multi-year sprinter training system. The data is represented in Figure 1.

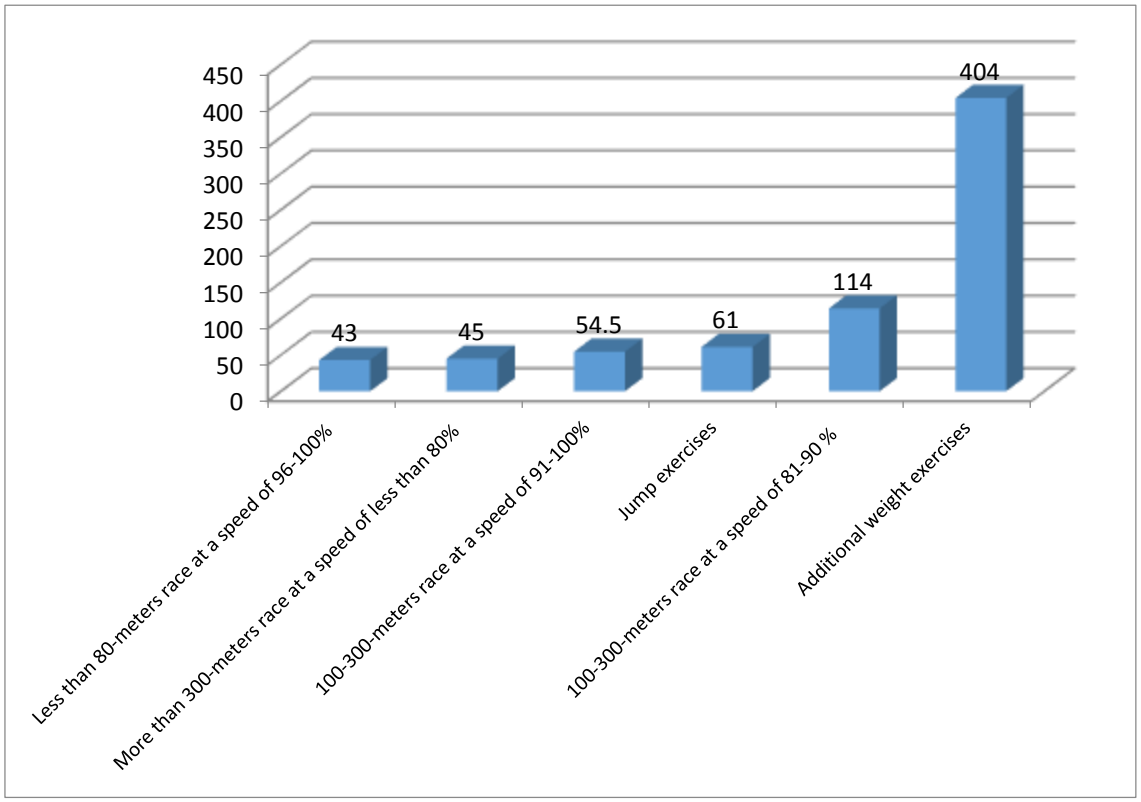

Figure 1. *Dynamics of kinds of the training loads of the beginner and the qualified sprinter in the multi-year training system (in %)*

Peculiarities of distributing the strength exercises in the multi-year structure of the training loads of sprinters with different qualifications

The first thing that must be noted is significant increase in a volume of the weight exercises performed by athletes from the beginners to the qualified sprinters. For the whole multi-year cycle of the sporting improvement, this kind of a load increased by 404 %. Such a tendency is quite justified. The sprint effectiveness depends in large part on the quality and quantity of the strength work. If at the beginning of the sporting career the race results at the competitive distance were worse than the results of the general physical and technical training, then at the peak of the sportsmanship, it is necessary to use the strength exercises in sufficient quantity to preserve the dynamics of the results improvement.

When analyzing the research results, it is possible to list the training tasks that are solved by means of the weight exercises: to increase the sprinters' strength potential; to redistribute the functional capacities with emphasis, in the first instance, on developing the muscle groups, on which the race technique efficiency and the distance motion speed depend; to optimize the runner's muscle bulk to a required magnitude in proportion with the basic anthropometric indicators.

Thus, the strength exercises are one of the main training loads. It is necessary to pay particular attention to this

kind of a load while planning the training process, since the adequate use of weight exercises preserves a dynamics of the growth of the sporting results during the multi-year sprinters training, including the sportsmanship stage. That's why the strength load is built up in a greater degree than a volume of exercises of another purpose.

Peculiarities of distributing the jump exercises in the multi-year structure of training loads

Let's consider the peculiarities of using the jump exercises in the multi-year structure of training the sprinters. This training load increases from the beginner to the qualified athlete by 114%. The annual stage-to-stage growth has a significant magnitude. The jump exercises volume increases in the same quantity as the majority of training loads do. The listed peculiarities show that the beat exercises are not dominating. Their application is justified only to solve a task for adapting the locomotive system to specificity of the maximum-intensity race. On the basis of the received data analysis, it is possible to designate a list of tasks for the jump loads: functional training of the locomotive system for the maximum-intensity race; the strength potential transformation to an ability to make an explosive effort for the shortest possible time during the maximum-intensity race; development of some technical elements that the sprinters need.

Thus, the jump exercises in the represented training loads structure are auxiliary exercises. The main task is to train the athletes' ligamentous and muscular system for the high-intensity race loads. The jump load growth for athletes from the beginner to the qualified sprinter is at a level of average indicators of all the loads used in the sprinters training.

Peculiarities of distributing the technical training loads in the multi-year training load structure

The technical training is an indispensable element of the training load structure. This kind of training at all the stages from the beginner to the qualified athlete is used in significant volumes. By the way, the time spent for the technical training increases twofold in the multi-year structure. 80 hours at the initial training stage increase to 160 hours for the qualified athletes. This peculiarity is explained by the fact that the sprint's rational technique is one of the leading factors of improving the sporting result. Apart from that, permanent improvement of technique of the start, the distance race and the finishing is driven by several circumstances. Firstly, the sporting results growth makes the sprinters form many technical race elements, since the available skills lose their efficiency as the distance motion speed increases. Secondly, the scientists develop new technical approaches in order to optimize the athletes' efforts, which, in its turn, creates favorable conditions for renewing the records. During the sprinters training, the technique exercises solve several training tasks: to rationalize the sporting activities for improving the competitive result; to improve the special skills for performing the competitive exercises within the existing rules; to develop the myesthesia for timely tension and relaxation in performing the running step; to change the biomechanical indicators that determine the peculiarities of interaction between the foot and the support at the moment of contact, and the athlete body weight transfer to the jump-off phase. The technical skills influence the hands work quality during the race, the flight time and a position of various body parts during the start and the finishing burst. Good or bad technical skills can improve or worsen the athletes' efficiency. Irrational technique requires the additional physical efforts for performing the training tasks. At the tensest race moments, the irrational technique can cause the traumatization.

Thus, the technical training significance in the training loads system cannot be overestimated. A lot of hours are driven by importance of this kind of the training work. The main task, which is solved by the technical training, is to rationalize the motions in order to improve the sporting result, to preserve the efficiency, and to perform the competitive exercise according to the established rules.

Peculiarities of distributing the general training loads in the multi-year training load structure

The general physical training is an integral part of the whole multi-year training load structure. The general physical training is planned in sufficient volume, from 80 to 160 hours per year, for the beginners and for the qualified athletes. A great deal of time, which is spent for the general physical training, is driven by the necessity to lay down the foundations of a subsequent special load. Availability of the necessary and sufficient volume of this kind of exercises is an indispensable condition of adequacy of the training load structure not only at separate stages of the athletes training, but also in the multi-year structure of the sprinters training.

The use of the general physical exercises volume, which is offered in this paper, will help to solve the following training tasks: to strengthen and develop the locomotive system, the cardiovascular and respiratory systems; to create a rational relation of the strength qualities and the general endurance; to ensure the implementation of the basic functions of an organism at a qualitative level; to remove the prerequisites for the forced development of qualities that are specific for the sprinters; to create condition for increasing the sporting career duration with full-fledged implementation of the available talents and faculty through the rational volumes of the general physical training at all the training process stages.

Thus, the general physical training is represented in the multi-year training load structure in considerable volumes. This kind of training work solves the most important tasks that supply the sprinters with fundamental qualities for using the high-intensity special loads.

Peculiarities of distributing the maximum-intensity race volume at the sections of less than 80 meters in the multi-year training load structure

Let's consider a group of special race loads that are the necessary part of the sprinters' training process. The most outstanding representative of these loads is the maximum-intensity race at the sections of up to 80 meters. The Figure shows that a growth of this exercise from the initial training stage to the master of sports makes up 6.4 kilometers (43 %). Increase in this kind of the training load in comparison with other exercises has the least magnitude. This is explained by the fact that the maximum-intensity race at the section of up to 80 meters is getting less important as the sprinters' sportsmanship increases. At the beginning of the sporting career, the high-intensity race at very short sections solves a task of improving the quickness and the maximum speed at the 60 meters distance. The qualified sprinters orientate themselves at distances of 100 meters and more. That's why the short section race does not have a sufficient training potential. While considering a load in the maximum-intensity race at the sections of up to 80 meters, it is possible to list the tasks that can be solved during the training of less qualified athletes: to improve the motion quickness; to teach the crouch start technique; to overcome a speed barrier at a short section of the sprinter distance; to improve the maximum-intensity race technique; to use a tonic impulse for mobilizing the physical and psychic capacities before a responsible start or the most important training load; to learn and improve a technique of passing the baton in the maximum-intensity race; to improve a technique of braking after the maximum-intensity race as a short section of the running track beyond the finish line.

Thus, the maximum-intensity race at the less than 80 meters sections has the lowest growth indicator in a system of the multi-year sprinters training. This training load is important at the first stages of the sprinters' sporting career. As the athletes' qualification is improved, the maximum-intensity race at the short sections becomes less significant.

Peculiarities of distributing the race volume at the 100-300 meters sections at a speed of 91 – 100 % in the multi-year training load structure

This kind of the training load is used during the whole period of training the sprinters from the beginner to the master of sports. A growth of this kind of race in the multi-year structure makes up 54.5%. As the qualification is raised,

this training load is getting more significant. This is explained by the fact that the 100 and 200 meters race distances are the main sprinter distances of the qualified athletes. For the sprinter-beginners, the listed distances are important too, but in the event if a level of their physical development and functional readiness allows them to cope with an extreme load at the top of capacities of their locomotive system.

The use of the submaximum and maximum-intensity race at the 100 – 300 meters sections solve the following training tasks: to implement the accumulated potential of the strength capacities at a competitive distance in the preparatory period; to develop and improve the speed endurance; to improve various technique elements in the submaximum and maximum speed race at a competitive distance; to control the quality of preliminary training and efficiency of the used structure of training loads; to improve the biomechanical characteristics during the race at a competitive distance, such as the contact time, the flight time, efficiency of interaction of the muscles tension and relaxation phase, the hands motion quality, and the trunk and head position in the space; to adapt all the organism systems ensuring the maximum-intensity race to the coordinated interaction in order to optimize the distance motion.

Thus, the submaximum and maximum-intensity race at the sections of from 100 to 300 meters is the most important part of the training structure. This kind of a load is the most specific for the sprinters and has the special purpose. This race becomes the most significant as the sportsmanship increases. It may be said that for the sprinters, the results at the listed distances are the sporting career culmination. The planning of the considered training load at the stages of the initial sprinter training does not prevail, since the maximum and submaximum speed race at the 100 – 300 meters sections can be used only by the athletes who have the sufficient and necessary physical and functional capacities.

Peculiarities of distributing the race volume at the 100 – 300 meters sections at a speed of 81 – 90 % in the multi-year training load structure

This kind of a load has the greatest growth from the beginner to the master of sports among the race exercises of other duration and intensity. Its increase in the multi-year structure can reach 100 and more percent. This peculiarity is explained by the fact that this kind of a load is the main training load for the qualified athletes and the least necessary for the beginners. The 100 – 300 meters distance race at a speed of 81–90% at the height of the sporting career is important for several reasons. Firstly, this is the optimum load alternative for designing the competitive distance at a special preparatory stage. Secondly, the race in this mode comprises solution to many training tasks, for example: to develop a feeling of the competitive distance; to improve the tactics of covering the competitive distance; to implement the physical potential accumulated in the preparatory period, at the moment of covering the competitive distance; to develop and improve the speed endurance; an initial stage of improving a technique of the race at a distance which is equal to the competitive distance in terms of length; to coordinate functions of the organism's various systems that, in the first instance, ensure the results at the competitive distance; to develop the stable reflex to the peculiarities that the sprint has. This training load helps to experiment in order to choose the most rational strategy of training the athlete for the best possible result.

Thus, the 100 – 300 meters race with an intensity of 81–90% is the most needed training load for all the sprinters except for the beginners. This exercise potential favors the development and improvement of the physical capacities, technical elements and the tactical and strategic developments.

Peculiarities of distributing the race volume at the section of more than 300 meters at a speed of less than 80 % in the multi-year training load structure

This kind of a training load does not lay claim to great significance among other exercises represented in the multi-year structure of training the sprinters. A growth from a stage of training the beginners to a stage of the sportsmanship is possible within 50%. The use of this kind of the race load is likely to be of greater importance at the beginning of the sporting career than in the middle or at the end. The race at a moderate speed at the sections of more than 300 meters is used to solve the following training tasks: to develop and improve the general endurance; to build up the race practice in the moderate motion mode; to improve the race technique; to implement the strength capacities in the race.

Thus, the race at the sections of more than 300 meters at intensity of less than 80 % cannot be considered as the main training load. This load is important to solve the secondary training tasks. This kind of the race becomes less significant, as the athletes become more qualified. At the initial training stage, the use of this kind of a load solves the task of developing the general endurance and of adapting the athletes' locomotive system to peculiarities of motion at the competitive distance.

Conclusion

1.The training load structure at the first stage of the sporting improvement mainly solves the tasks of the technical and general physical training. The specialized exercises are used in the minimum quantity. The represented ratio of exercises of different purposes excludes the possibility of using forced loads.

2.The training load structure for the 2nd grade athletes mainly solves the training tasks of the technical and general physical training with the initial elements of specialization. The ratio of the training means of different purposes makes it possible to rationally use the athletes' physical potential to come to the next stage of the sporting specialization.

3.Building of the training loads structure for the 1st grade runners has its peculiarity. The main goal of this system is a priority of improving the special sprinter skills making it possible to cover the competitive distance in the optimum mode in term of the technique and functioning of the organism systems, on which the result depends in the first instance. This stage of the sporting improvement comprises the in-depth specialization beginning.

4.The training load structure of the sprinters-candidates for the master of sports is mainly aimed at deepening the specialization in all the training spheres, on which the competitive distance result depends.

5.The training load structure of the masters of sports is supposed to ensure the achievement of the training process goal that consists in preserving the sporting results quality during the optimum period of time until the signs of destructive phenomena in the organism appear. The training priorities are to increase the sporting carrier time; to decrease the training process tension gradually; to finish the competition performances reasonably.

6. The integrated use of the experiments results, which are represented in the scientific literature, made it possible to build the multi-year training load structure for the sprinters. This structure is developed on the basis of the "gradualness and succession" principle.

The multi-year planning of training loads on the basis of the gradualness principle makes it possible to increase the strength exercises volume from the beginner to the master of sports by 400%, the jump exercises volume - by 61%. Quantity of the race at the sections of 100-300 meters and at the sections of less than 80 meters at the maximum speed can increase by 54.5% and by 43%, respectively.

The research results, which are represented in the paper, make it possible to switch over to the building of a rational structure of the training mesocycles that will make the content of the annual training stage, for each qualification group of athletes separately.

7.The strength exercises are the priority facility of training the qualified sprinters. Adequate use of the weight exercises will preserve a dynamics of the sporting results growth during the multi-year sprinters training. That's why the strength load is built up in a greater degree than the exercises volume of another purpose.

8.The jump exercises in the training load structure are an auxiliary load. The main task is to train the athletes' ligamentous and muscular system for the high-intensity race loads.

9.The maximum-intensity race at the sections of less than 80 meters has the lowest growth indicator in a system of the multi-year sprinters training. It is reasonable to use this training load at the first stages of the sprinters' sporting career. As the athletes' qualification is raised, the maximum-intensity race at the short sections becomes less significant.

10. The load in the race at the 100-300 meters distances at the intensity of 81–90% is the most necessary training load for all the sprinters except for the beginners. This exercise potential favors the development and improvement of the physical capacities, the technical elements, and the tactical and strategic developments.

11. The submaximum and maximum-intensity race at the sections of from 100 to 300 meters is the most important part of the training structure. The planning of the considered kind of a training load at the stages of the initial sprinter training does not prevail, since the race at the maximum and submaximum speed at the 100 – 300 meters sections can be used only by the athletes who have the sufficient and necessary physical and functional capacities.

12. The race at the sections of more than 300 meters at the less than 80% intensity cannot be considered as the main training load. The load is important for solving the secondary training tasks. This kind of race becomes less important as the athletes become more qualified. At the initial training stage, the use of this load solves a task of developing the general endurance and adapting the athletes' locomotive system to peculiarities of the motion at the competitive distance.

As a result of the practical application of the recommendations, which are represented in the paper, several important tasks for the youth sports were solved and can be solved during the further application. These tasks are to use the special loads of permissible volume and intensity; to use the necessary and maximum permessible quantity of general physical exercises; to abolish an idea of the forced training.

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