CZU 796.422: 796.015.1

THE VARIANTS OF STRUCTURAL ORGANIZATION OF STRENGTH TRAINING IN MIDDLE DISTANCE RUNNERS AGED 13-15 YEARS IN THE ANNUAL CYCLE

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Abstract. *The problem of finding appropriate forms of structural organization of loads in annual cycle is becoming important for improvement of quality of young athletes training. This notion presupposes a stable order of combination of the parameters having different primary focus. The structure reflects the orderliness of connections in the system and provides its qualitative definiteness. Despite the fact that to solution of this problem in respect of training young middle distance runners has been paid sufficient attention, experts still have different views on forms of organization of impacts of strength character in annual cycle. With the aim of identifying optimum organization of impacts of strength character in the annual training cycle of runners aged 13-15 years on average distances, a survey was conducted among specialists (n = 21) who were asked to rank volumes of loads in annual cycle and rate them on a four-point scale depending on their value. The study of organization of loads of strength orientation was carried out in the framework of the analysis of their development at the stage of initial sports specialization on the basis of two parameters: dynamics of parameters of loads and coefficient of variation. The analysis allowed identifying two variants of their organization in the annual cycle: steady and variable.*

Keywords: *running on average distances, a stage of initial sports specialization, strength training, annual cycle*

Introduction

The problem of optimization of forms of organization of loads in annual cycle, i.e. the search for appropriate structural construction, is becoming important for improvement of quality of training of young athletes. As a rule, the term structure of the training loads is commonly understood as a relatively stable order of combination of the parameters having different primary focus, i.e. their logical ratio and interconnection with each other. The structure reflects the order of relations of the system, ensuring its quality definiteness [3, 4, 8 etc.].

Despite the fact that to the solution of this problem in relation to middle distance runners has been given sufficient attention, and recommended variants for its practical implementation have been scientifically grounded, experts still have different views on forms of organization of impacts of strength character in training cycles. The greatest differences among professionals are observed in the structural organization of loads in this direction in the annual training cycle of young sportsmen [1, 2, 5, 6, 7 etc.].

Methodology and research organization

In the study, there was conducted a survey of specialists about their preferences regarding forms of organization of loads of different primary focus in the annual cycle. Its results enabled them to differentiate them into two groups which can be identified as sympathizers of steady or variable distribution of loads in the annual cycle.

With the aim to reveal the existing variants of the structural construction of loads in the annual cycle of preparation of sportsmen aged 13-15 years, specializing in running on average distances, the study conducted a survey of professionals (n=21). Respondents were asked to rank volume of loads in the annual cycle and rate them on a four-point scale depending on their value (i.e. small, medium, considerable, large), according to the existing classification [3, 4, 8 etc.].

Generalization of the obtained data allowed to reveal the dynamics of the loads in the annual training cycle in middle distance runners on SISS (stage of initial sports specialization), expressed by the value of both total and partial parameters. The study found a fairly high degree of variation, reflected in the value of the coefficient of variation (Vc) which may indicate the lack of homogeneity of the analyzed sample.

The identification of the structural construction of loads in the annual cycle considered in the context of the variants discussed above was carried out in the frame of their differentiation on the basis of forms of organization. The analysis procedure was provided for determining the confidence interval of the forecast at the level of probability of 0.05 of the average value of the total parameter of loads. The prescribed range of variation was used in differentiation as a guide. If the total parameter of annual loads varied within

the confidence interval, this "version" of their organization was related to the steady version, but otherwise – variable.

Discussion of the problem of organization of strength training of young middle distance runners in annual cycle beyond framework of an integrated system of training effects of different primary focus is not advisable. As a consequence, the study of variants of the organization of loads of strength character was held in connection with analysis of load distribution in means of cross-country nature.

The results of the study and their discussion

The results of the study indicate that 47,6% of respondents prefer the variable form of the organization of loads, and 52,4% – the steady one.

Differentiation of "versions" of the training loads in annual cycle in two variants contributed to decrease in the value of Vc in total parameters. Thus, in the steady variant of organization of loads the Vc decreased to 21,9% and in variable – to 35,92%. Dynamics of total parameters of loads in the analyzed versions of the forms of distribution in annual cycle is presented in Figure 1.

It should be noted that to the reasons of high values of VC, in case of a steady variant of the construction loads in the annual cycle, can be attributed the existence of its two varieties:

- in varying of volume of loads in year-round training in range of its lower limit and average value;

- in varying of volume of loads in year-round training in range of its upper limit and average value.

There have not been identified such differentiation in the variable variant

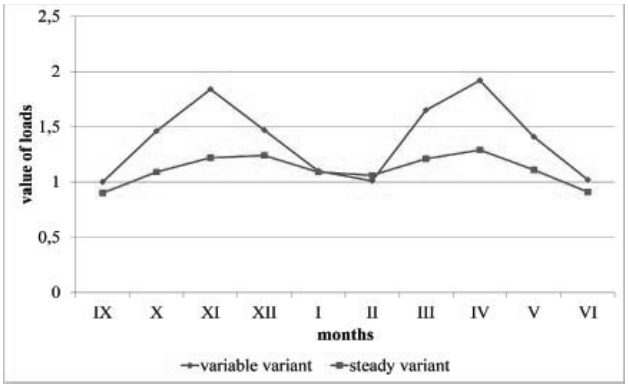

Fig. 1. Dynamics of total parameters of loads in annual training cycle in middle distance runners on SISS, c.u.

Distribution of impacts in the annual cycle, both in steady and variable variants is subjected to certain logic and therefore allows revealing the general regularity. The study revealed that periods of reduced VC coincide with the periods when parameters of the training loads reach their maximum values. There are two such periods in annual cycle: November-December and March-April. This tendency is observed in both cases. The differences are visible only in degree of variation of analyzed parameter. Thus, in steady variant, an increase in loads is by 0,32 c.u. in first case (IX-XI months) and by 0,23 c.u., in the second (II-IV months), and in the variable by 0,84 c.u. and by 0,91 c.u. respectively. A similar trend is observed at lower loads (XI-II months: "steady" – 0,15 e. and "variable" is 0,83 e. options; IV-VI month: "steady" is 0,38.e. and "variable" is 0,9 c.u. options). The results of the analysis allow speaking about the presence in dynamics of loads of "variable" variant of more distinctive changes in their value. The decrease in value of Vc during the periods when the parameters of the training loads reach their maximum and minimum values may indicate the identity of views of specialists on planning of loads on SISS.

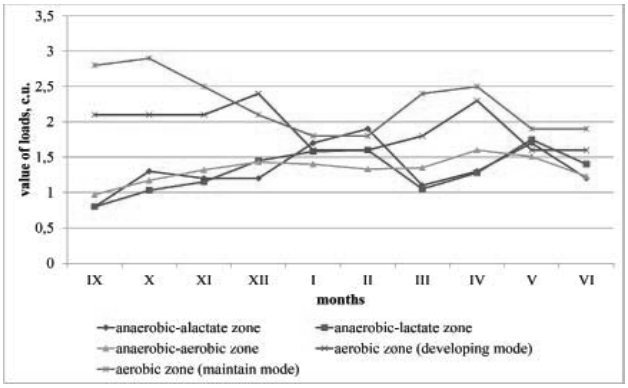

Fig. 2. Steady variant of load distribution in annual training cycle in average distances runners aged 13-15 years in means of cross-country nature (zones of energy supply), c.u.

The procedure of identifying the specific dynamics of the training loads in the annual cycle usually provides for the preliminary differentiation on a particular characteristic. In cyclic types of athletics the zones of energy supply are traditionally used as such characteristic. Analysis of load distribution in the annual training cycle in middle distance runners on SISS makes sense

only under the condition of their detailing on the basis of "commonly used means", i.e. means of running and strength training. The results of this analysis are presented in Figures 2-3.

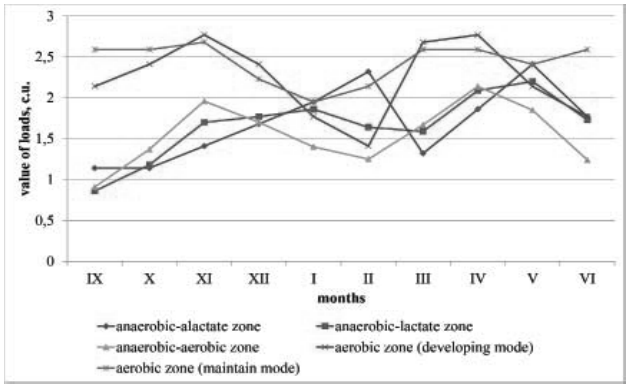

Fig. 3. Variable variant of load distribution in annual training cycle in average distances runners aged 13-15 years in means of cross-country nature (zones of energy supply), c.u.

In steady variant of loads construction in the means of running training the total amount of their variance is equal to 9,81 %, and in case of variable is 30,2%. The differences in this parameter, though to a lesser degree, but have a place in strength training, respectively 33,55% and 46,46%.

The results of the analysis of dynamics of parameters of loads in means of running training show that the training effects of aerobic character in a "steady" distribution dominate in their value throughout the year. It should be noted that in the first semi-annual macrocycle (1 SaMC), their use is of a compensatory nature in relation to the loads with characteristics of different primary focus. At the same time, the dominance of impacts of aerobic orientation, developed in maintain mode (IX-XII months) is replaced by the dominance of loads of the same orientation, but used in developing mode (XII month).In the further their parameters stabilize (I-II months). In the second semi-annual macrocycle (2 SaMC) their dynamics is similar both in the achievement of peak values in the IV month and in the further stabilization of values of their parameters in V-VI months. The loads in means of anaerobic-alactate orientation in 1 SaMC demonstrate a stepwise increase of parameter from IX to II months where reach their maximum value. Its subsequent sharp decline to the third month changes with the dynamics which is similar with changes in this parameter during XII-III months. The dynamics of influences of glycolytic direction in 1 SaMC has a compensatory nature in relation to dynamics of lactate loads, and in 2 SaMC is identical. The parameter of loads of a mixed zone of energy supply varies over the annual cycle insignificantly, but in its dynamics their concentration takes place two months (XII and IV) before the period of main competitions. A common trend for all the analyzed parameters of effects is their attainment of peak maximum values in the middle of the preparatory periods, but minimum in the competition.

In variable variant the loads of aerobic orientation are also prevailing. There is a more obvious variation of loads mastered in the developing mode. Periods of their concentration are longer (X-XI and III-IV months). As in case of steady options, the dynamics of the loads of aerobic orientation has a compensatory character, but only in relation to loads of lactate orientation. The dynamics of the parameter of loads of alactate character from the beginning of annual cycle to the II month where it reaches its maximum values that can be described as a gradually progressive. Its changes during the III-VI months are substantially identical to the dynamics of this parameter during the XI-III months. A distinctive feature of dynamics of parameter of glycolytic loads is reaching the peak values a month before the main starts of the season. In 1 SaMC dynamics of the value of this parameter is "intermediate" between the parameters of loads, developed in mixed and alactate zones of energy supply. In the 2 SaMC their dynamics coincides with changes observed in loads of mixed primary focus.

In figures 4-5 there are presented the data of analysis of dynamics of partial values of loads in means of strength nature in annual cycle. According to the data, changes of their parameters in annual cycle indicate the presence of certain similarities in approaches to the form of their organization. In contrast to the dynamics of loadings in the means of running training, the dynamics of loads of strength orientation in the annual training cycle of young runners has a more structured nature of their construction, expressed in a clear alternation of periods where their values reach their maximum and minimum. In the annual cycle there are two periods and

they are logically justified because they coincide in time with the participation of young runners in competition (I-II and V-VI months) and emphasized enhancing of their motor capacity (XI-XII and III-IV months), taking into account the time needed for recovery. Differences take place only in the magnitude of variation of loads and nature of their concentration in time. Thus, in the steady variant there are some priorities to use loads of different zones of energy supply. Simplified ranking can be carried out on the basis of the principle of decreasing dominance. In the variable variant, such situation was not revealed. The only exception is the loads of aerobic orientation, which are mastered in a much smaller volume compared to the rest. To the number of reasons of «dismissive» attitude to loads of aerobic orientation in the means of strength training can be attributed their dominance in the means of cross-country nature. Dynamics of alactate impacts in means of strength training is also connected with the use of loads of same orientation in means of cross-country nature. Improvement of the mechanism of alactate energy suply of motor activity of runners in the annual cycle is realised by means of consistent dominance of loads of this kind in the means of running, at first, and then strength training. In case of loads of glycolytic direction, it is observed the same trend but "exactly to the opposite". Loads in the mixed zone of energy supply are mastered in parallel use of both running and strength training means. It could be also mentioned a more "concentrated" nature of the applied loads of strength orientation in variable variant in the annual cycle, i.e. their concentration in a more narrow time range.

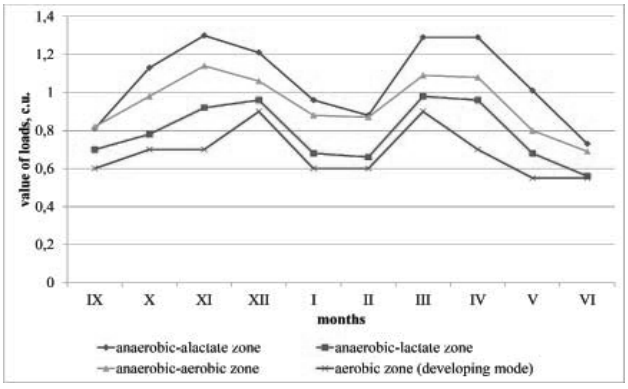

Fig. 4. Steady variant of load distribution in the annual training cycle in runners aged 13-15 years on average distances in the means of strength character (areas of energy supply), c.u.

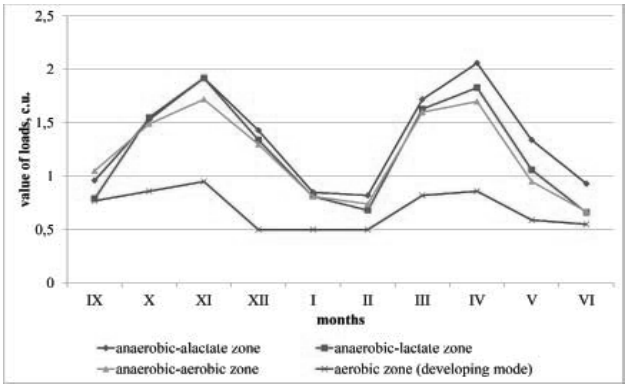

Fig. 5. Variable variant of load distribution in the annual training cycle in runners aged 13-15 years on average distances in the means of strength character (areas of energy supply), c.u.

The data obtained during the study also indicate that in both analyzed variants, the loads of proper strength direction in the I-II and V-VI months are used in minimal amount. It is revealed the higher level of their concentration in 1SaMC. In both cases the peaks of their maximum values coincide (XI and III months). At the same time, the dynamics of their parameter in the variable version is more obvious than in a steady one. The character of distribution of training loads of a group of means of speed-strength orientation in the examined variants has the sign of a certain similarity. Thus, in both studied variants the largest volumes of loads of this group of means are mastered in 2 SaMC. Peaks of their maximum (XI and IV months) and minimum values (II and VI months) also coincide. In 2 SaMC maximum values in this parameter are obtained one month later (IV month) than in the parameter of impacts of proper strength character. Dynamics of loads of strength orientation, mastered by runners aged 13-15 years in the endurance mode, is similar in its character to the construction of training loads of group of means of speed-strength orientation. The difference is observed in the magnitude of variation of parameter and during the period they reach the maximum values. Low values of parameter of loads of strength orientation, mastered in endurance mode, are apparently compensated by their high volumes in means of cross-country character (Figures 6-7).

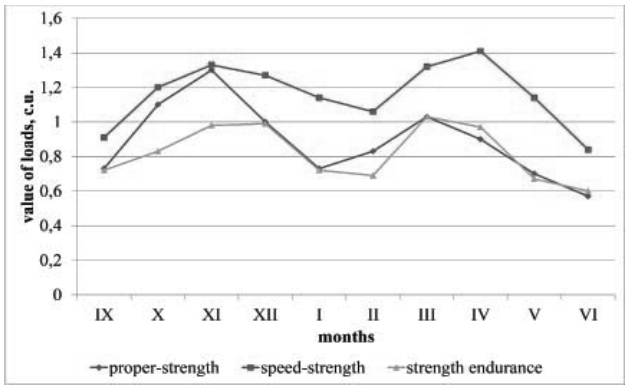

Fig. 6. Steady variant of load distribution in the annual training cycle in runners on average distances aged 13-15 years in the means of strength character (the primary focus), c.u.

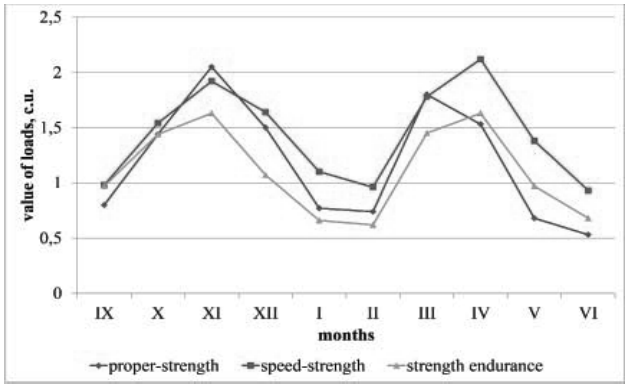

Fig. 7. Variable variant of load distribution in the annual training cycle in runners on average distances aged 13-15 years in the means of strength character (the primary focus), c.u.

Conclusions

It should be noted that in preparation of middle distance runners aged 13-15 years two forms of load organization in the annual cycle are applied which can be roughly identified as variable and steady variants. It is found that 47,6% of respondents prefer the first one. The kinds of steady variant are revealed: at varying of loads in the range of their lower limit and the average value, as well as at their variation in the range of their upper limit and the average value. In the dynamics of the loads alternation of periods is clearly expressed where they reach their maximum and minimum values. They coincide in time with the accentuated increase in runners of their motor capacity and its realization in competition. To the number of reasons of "dismissive" attitude to the loads of aerobic nature in means of strength training can be attributed their dominance in means of cross-country nature. Dynamics of alactate impacts in means of strength training is also associated with the use of loads of the same orientation in the means of cross-country nature. Improving of alactate mechanism of energy supply is carried out by successive domination of loads of this nature in means of running training, and then – of strength one. In loads of glycolytic direction it is observed the same trend, but exactly to the opposite. Loads of mixed zone of energy supply are mastered in means of running and strength training simultaneously.

It is established that in both variants, the loads of proper strength orientation in the competitive periods are used in a minimum volume and in a maximum in preparatory periods. Dynamics of loads is more expressed in the variable variant. The high level of their concentration is in 1 SaMC. Load distribution of group of means of speed-strength character in both variants has a certain similarity. The largest volume of loads is mastered in 2 SaMC. The peaks of maximum and minimum values coincide. In 2 SaMC the maximum parameter is reached one month later than in a parameter of impacts of proper strength character. The dynamics of the loads of strength character, mastered in endurance mode, is close to the building of loads in means of speed-strength orientation. Differences are observed in time of reaching the maximum values in variation of the parameter and the value of mastered volumes.

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