



The methodology of organising the training of middle-distance runners aged 15–17 years in an annual training cycle

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Abstract

Objective of the study is to develop a methodology for organising the training of female middle-distance runners aged 15–17 in the macrocycles of an annual training cycle and to substantiate its effectiveness.

Methods and structure of the study. On the basis of an analysis of literature data and the authors' own research results, a methodology was developed for organising the training of female middle-distance runners at the stage of advanced specialisation in an annual training cycle, which includes the projected dynamics of indicators of athletes' special preparedness, as well as the rational distribution of the volume of the main training means in the autumn-winter and spring-summer macrocycles. The methodology was tested in the training process of 13 female middle-distance runners aged 15–17, and its effectiveness was assessed by the magnitude of improvement in competitive results and indicators in control tests compared with the previous year.

Results and conclusions. The character and dominant orientation of training influences for female middle-distance runners at the stage of advanced specialisation were determined by month of the preparation macrocycle. It was shown that load parameters in terms of volume and orientation, as well as content and character, must correspond not only to the strategic objectives of athletes' preparation in the macrocycle but also be commensurate with the biorhythmological patterns of their body's functioning in the mesocycle. The results of the pedagogical experiment demonstrated the productivity of the developed methodology and the expediency of an individual approach in the implementation of the training process.

Keywords: methodology, female middle-distance runners, 15–17 years, macrocycle, training means, individual approach.

Introduction. Ensuring the optimal level of readiness of a female athlete for the main competitions is possible only on condition of the effective use of rational forms of constructing training loads in the annual cycle and its individual structural formations [1, 2, 5]. At the same time, the organisation of the annual macrocycle is a kind of "roadmap" for the athlete's preparation for the planned time cycle, which is conditioned by determinants that determine the effectiveness of their adaptation to the means and methods of influence characteristic of the given sport [6].

As Yu.V. Verkhoshanskiy [1] emphasised, the study of adaptation mechanisms or factors determining the special work capacity of an athlete "in general", without taking into account the specifics of their improvement within the framework of the real temporal structure of

the training process, may be of a certain cognitive interest, but may not carry any tangible practical benefit. Therefore, the prerogative for coaches should be the establishment of the fundamental orientation of the training process, which will make it possible to determine the predominant character of the application of particular training influences at each structural unit of the annual preparation cycle, taking into account the individual characteristics of the athlete, and the final expression of the degree of rationality of training process management and the objective characteristic of its productivity will be the sporting result shown by the athlete at the main start of the season.

Thus, the development of rational ways of combining the structural units of the annual cycle of preparation of female middle-distance runners into a single



system, taking into account the specific stage of long-term improvement, the interrelationship of prescribed training influences and the inherent individuality of the athlete, is a pressing problem.

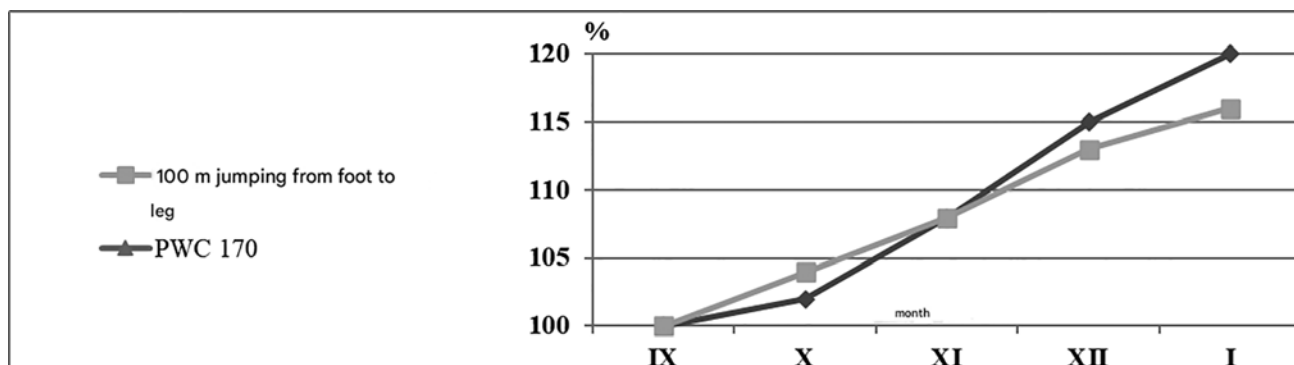
Objective of the study is to develop a methodology for organising the training of female middle-distance runners aged 15–17 in the macrocycles of an annual training cycle and to substantiate its effectiveness.

Methods and structure of the study. On the basis of an analysis of literature data [3, 5, 7] and the authors' own research results [4, 8], a methodology was developed for organising the training of female middle-distance runners at the stage of advanced specialisation in the annual training cycle. The methodology includes the projected dynamics (model) of indicators of athletes' special preparedness, represented by results in the jump test and data on physical work capacity (PWC_{170}), as well as the rational content of the main training means and the distribution of their volume, taking into account the specifics of the prepa-

ration of female runners in the autumn-winter (Fig. 1) and spring-summer (Fig. 2) macrocycle.

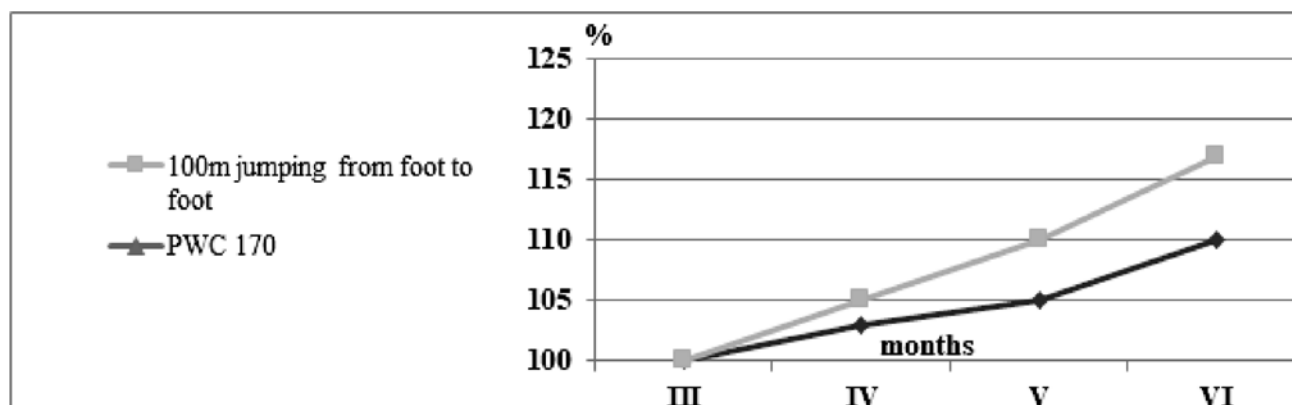
The PWC_{170} test ($\text{kgm}\cdot\text{min}^{-1}$) was used to determine the aerobic component of the physical work capacity of the athletes, and the result (conventional units) in covering a 100-metre distance with alternating-leg bounding jumps (the product of the number of jumps and the execution time) assessed the special strength preparedness of 800 m runners. The target objectives of the macrocycles provided for changes in the condition of the athletes by the required magnitude by the first and second competitive periods. This was achieved with the help of a specific programme of training influences (Table 1), in which the volume of the main means of preparation for the specific macrocycle and its distribution by months (as a percentage of the total amount in the macrocycle, taken as 100%) are presented.

The effectiveness of the implementation of the training methodology was ensured by regular (1–2 times per mesocycle) control assessment of the current state of the athlete's potential, comparison of its



Training influences (intensity zones)	Volume per macrocycle	Approximate load distribution by month, in % of total volume per macrocycle				
		IX	X	XI	XII	I
Aerobic recovery, km	987.6±134.7	35	27	15	14	9
Aerobic developmental, km	316.1±71.6	31	25	18	16	10
Mixed aerobic-anaerobic, km	97.4±14.1	33	6	15	6	3
Anaerobic glycolytic, km	18.4±3.3	-	-	26	38	36
Anaerobic alactic, km	4.9±1.2	-	-	22	33	45
Jumping exercises, km	8.5±2.9	37	22	17	15	9
General physical preparation, hours	34.1±11.6	32	29	25	10	4

Figure 1. Methodology of organising the training of female middle-distance runners in the autumn-winter macrocycle: above – projected dynamics in the macrocycle of the physical work capacity indicator and jump test result (in %); below – main training means and their distribution in the macrocycle as a percentage of the total (100%) volume



Training influences (intensity zones)	Volume per macrocycle	Approximate load distribution by month, in % of total volume per macrocycle			
		III	IV	V	VI
Aerobic recovery, km	736.1±111.5	48	30	16	6
Aerobic developmental, km	208.9±19.9	44	27	20	9
Mixed aerobic-anaerobic, km	80.8±10.3	39	26	18	17
Anaerobic glycolytic, km	21.8±6.7	9	17	36	38
Anaerobic alactic, km	5.3±1.1	-	29	30	41
Jumping exercises, km	8.5±1.7	34	29	27	10
General physical preparation, hours	34.1±7.2	39	32	26	3

Figure 2. Methodology of organising the training of female middle-distance runners in the spring-summer macrocycle: above – projected dynamics in the macrocycle of the physical work capacity indicator and jump test result (in %); below – main training means and their distribution in the macrocycle as a percentage of the total (100%) volume

real characteristics with the model ones, and correction, if necessary, of the training programme.

Results of the study and discussion. In the sporting practice of female runners at the stage of advanced specialisation, a predominantly 2-cycle periodisation, consisting of two macrocycles, is already used. In turn, the latter consist of mesocycles – a kind of "building blocks" that constitute the stages and periods of the annual cycle [5, 6].

Thus, the main mesocycles in the preparatory period are considered to be base mesocycles, which include 10–12 microcycles (in the autumn-winter macrocycle this is October-December, in the spring-summer – March and April) [3, 5, 7]. The programme of these mesocycles provides for conducting dominant work aimed at increasing aerobic-anaerobic capacities, developing physical qualities, and establishing the technical, tactical and psychological preparedness of the runners. The training programme already includes the use of diverse means, with their significant impact on the athletes' bodies [1]. The role of multi-jumps, jumps and uphill running increases.

In the control-preparatory mesocycle (in the autumn-winter macrocycle this is January, in the spring-summer – May), the emphasis is placed on increasing speed abilities and special endurance. Considerable attention is given to strengthening the muscles of the legs, abdominal press and back, developing flexibility, practising motor switching, improving the coordination structure of running movements and developing tactical elements.

In the competitive periods (February and June-August), the runners need to achieve the highest sporting results within the pre-planned timeframes of the major competitions. For this purpose, mainly individualised running training influences in the anaerobic glycolytic and anaerobic alactic zones of energy supply are used.

In the transition period, training sessions restoring the physical and psychological work capacity of the athletes should predominate. The main content of the sessions here comprises general physical preparation means used in an active rest mode: prolonged slow running, exercises with weights, swimming, sports games, and various types of throwing athletic implements.



When addressing organisational issues in the preparation of girls and women, one cannot disregard the results of numerous studies [8, 4, 7, 9–11], which indicate that training mesocycles should be constructed so that the content, means and methods of influence in each microcycle fully correspond to the level of work capacity, individual capacity for recovery, as well as the physical, functional and psychological state of the athlete, which are specific to her in one or another phase of the ovarian-menstrual cycle (OMC). Therefore, the training mesocycles were structured by us in accordance with the number of OMC phases and consisted of five microcycles, each of which differed in the orientation of sessions in accordance with changes in the functional state and special work capacity of the athletes in certain phases of the menstrual cycle. Following this scheme of constructing the training process promoted the interrelationship between the dynamics of training influences and the rhythmic wave-like changes in the functional state of the specific athlete's body.

The implementation of the developed methodology for organising the training of female runners in the macrocycles of the annual training cycle, individualised in accordance with the biorhythms of the athletes' bodies, showed its high productivity. Thus, the sporting results of the 13 athletes who took part in the experiment improved, on average, in the 800 m race by 4.1 s ($p < 0.05$), the indicators in jump tests and physical work capacity (PWC170) increased, respectively, by 7.8 and 8.9%, compared with the previous year. At the same time, thanks to the synchronisation of the preparation structure and the OMC phases of the athletes, the effectiveness and productivity of competitive activity increased, the training process became more manageable, and the result obtained was achieved without increasing the volume and intensity of training loads.

Conclusions. The character and dominant orientation of training influences for female middle-distance runners at the stage of advanced specialisation were determined by month of the preparation macrocycle. The data obtained indicate that the modulation of load parameters in terms of volume and orientation, as well as content and character, must correspond not only to the strategic objectives of athletes' preparation in the macrocycle but also be commensurate with the biorhythmological patterns of their body's functioning in the mesocycle. Such an organisation of the training process, based on the

constant consideration of the individual characteristics of each athlete, is the most justified at the stage of advanced specialisation, setting target benchmarks for the construction of preparation at the next stage of long-term improvement.

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