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Original Article

Training process construction of the qualified volleyball women players in the preparatory period of two-cycle system of the annual training on the basis of model training tasks

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Abstract.
Herein the results of the experimental substantiation of the effectiveness of the training process modeling of the qualified volleyball women players in the preparatory period of the first macrocycle during two-cycle construction of the annual training are presented. The pedagogical experiment lasted for two years, during which it was planned to hold the summative and formative stages. 16 qualified volleyball women players of 18 - 23 years old participated in the study. The peculiarity of constructing the preparatory period for the qualified volleyball women players at the formative stage of the experiment is that model training tasks for the various parts of the training (for general and special physical, technical and tactical, as well as game training), which formed the structure of the training sessions, micro- and mesocycles, were developed and planned to optimize the training process by forming urgent, delayed and cumulative training effects. In mesocycles of the preparatory period there was a general trend towards the gradual decrease in the proportion of non-specific means and increase of the specific ones until the end of the period (82,4% in the retracted mesocycle up to 25,8% in pre-competition period), gradual reduction of the loads in the aerobic mode power supply (from 79,0 up to 27,8%) and increase in the mixed (from 18,3 up to 61,6%) and anaerobic (from 2,7 up to 17,4%) ones, which was conditioned by the predominant use of model training tasks for general physical training at the beginning with the gradual decrease by the end of the preparatory period. At the same time, the number of model training tasks was increased for special physical, technical and tactical and game training. Reducing the intensity of the training process in the preparatory period and the redistribution of loads in the direction of increasing the number of special training and special training exercises, as well as reducing the means of general physical training at the formative stage of the experiment, compared with the summative one, contributed to a significant improvement in the functional performance of the qualified volleyball women players, as well as the manifestation of their physical qualities, indicating the effectiveness of the implemented model training tasks.
Key words: microcycle, mesocycle, period, qualified volleyball women players, model, training means, model training tasks.

Introduction.

After analyzing the development trends of the games-based sports, including volleyball, the experts confirm that optimization of the training effects in contrast to the constant increase of intensity and volume of the physical activity during the preparation process is necessary at the present stage (V. Platonov, 2013; V. Shamardin, 2013; Zh. Kozina et al., 2015, V. Kostiukevych et al, 2017; Ivashchenko et al, 2017; Melnyk et al, 2017; Pityn et al, 2017; E. Imas et al., 2018). This problem is especially relevant in the context of expanding of the competitive practices, which appears in reducing duration of the preparatory period. Thus, during a short period of time, the coach needs to prepare the players and bring them to the competitions in the optimal sports form, but at the same time preserving the functional reserves of the body of sportsmen to maintain their achieved level of fitness during a long competitive period.

It is worth noting that a lot of researches were devoted to the problem of constructing the training process of sportsmen of the games-based sports, and training of the skilled players was especially thoroughly studied. For example, V. Shamardin (2013) proposed a model correlation of the training loads of different physiological orientation for training of the skilled football players in the annual macrocycles, provided that they either only

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participate in the games of the championship and the Cup of Ukraine, or when the team won the right to play in UEFA Cup. Models of the structure and content of the training process of the highly skilled football players at the different stages of the annual macrocycles are presented in detail by V. Kostiukevych (2013). The author also devoted attention to the problem of training skilled hockey on the grass men and women players by developing models of the structural units of the training process within the framework of the annual macrocycles with the detailed justification of the load components (V. Kostiukevych, 2011). Further development of these studies was found in the works by I. Stasiuk (2013) on training of mini-football players during the competition period. As for volleyball, some aspects of construction of the training process of sportsmen at different stages of both annual and multi-year training are presented in the works by L. Airapetiants (1982), V. Holub (1993), A.N. Malikova et al (2018).

In general, the analysis of the scientific literature has shown that one of the promising ways of optimizing fitness in sports games is the use of modeling (V. Kostiukevych et al, 2018), which V. Platonov (2013) defines as "the process of constructing, studying and using the models for definition and specification of characteristics, optimization of the process of preparation and participation in the competitions". Modeling differs from the traditional planning by the fact that it operates not only the general parameters of the training process (volume of training, duration of the different stages, etc.), but provides for the regulation of the load components optimal for the directed formation of the training effects (T.O. Bompa, G.G. Haff, 2009; V. Platonov, 2013).

Among the effective areas in volleyball, modeling of the technical and tactical actions of the players (S.S. Yermakov, 2010; Y. Imas et al, 2017), modeling characteristics of the competitive activities (E.Iu. Doroshenko, 2013; N.Y. Shchepotina, 2015) and fitness (M. Stech, J. Skrobecki, K. Wnorowski, 2012) etc. were studied. At the same time, it is the modeling of the structural units of the training process within the annual macrocycles that allows optimizing the process of preparation of sportswomen, taking into account the main components of the training work (V. Platonov, 2013). Despite the significant number of studies on training of the qualified volleyball sportsmen, modeling of the content of the training process was considered fragmentary and at present there is no comprehensive approach to construction of the annual macrocycle of the qualified volleyball women players, informative indicators of the ratio of means and loads of the different physiological orientation.

Consequently, the perspective of using modeling in constructing the structural units of the training process of sportswomen of the team games-based sports and, at the same time, insufficient study of this problem regarding volleyball, necessitates its detailed study.

The purpose is to experimentally substantiate the effectiveness of using modeling in the construction of the structural units of the training process of the qualified volleyball women players in the preparatory period of the first macrocycle with two-cycle system of the annual training.

Material and methods.

Participants. 16 qualified volleyball women players of Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University of 18 - 23 years old participated in the study. The informed consent to participate in this experiment was received from all these participants.

Organization of research. The pedagogical experiment lasted for two years, during which it was planned to hold the summative and formative stages. The purpose of the summative stage of the experiment was to study the structure and content of the training process of the qualified volleyball women players in the traditional planning of the annual training and study its effectiveness. To achieve this goal, we implemented the following:

1) pedagogical control and timekeeping of the training activities (fixation of the nature and duration of exercises with the simultaneous registration of the heart rate using the heart rate monitor Polar RS800CX) of the qualified volleyball women players during the preparatory period, which made it possible to determine the volume and ratio of the various means and physical loads that were used in preparation of sportswomen;

2) pedagogical testing of the volleyball women players in the beginning and at the end of the preparatory period to determine the effect of the training loads on the fitness indicators of sportswomen using standard tests and trials. The physical fitness of the players was determined by the indicators of *the standing long jump* (characterizes speed-power qualities, was performed according to the standard method: from the starting position standing in front of the starting line a jump forward-up was performed with fixation of the length of the jump "upon the heels"; the best result from three attempts was taken), *standing high jump* (characterizes speed-power qualities, was performed near the vertical wall: height of the player with a raised arm was observed, followed by a jump up with fixation of getting the highest points on the wall; the difference between the values was found; the best result from three attempts was taken), *"herringbone" run* (characterizes high-speed endurance and coordination ability, was performed according to the standard method (Fig. 1): the player moved consequently from the middle of the front line up to 6 points, which are located on the side lines of the volleyball court at the distance of 3, 6 and 9 m, and returns to the starting position, the time of movement on the volleyball court was recorded).

The criteria for functional adaptation of the volleyball women players to the training loads included: *vital lung capacity* (characterizes the state of the respiratory system, was determined by the use of a dry spirometer: a

sportswoman in a standing position, after a maximum inhalation, made an even exhalation in the tube of the spirometer; the best result from three attempts was recorded); *PWC_{170} indicator* (characterizes physical working capacity, was determined by the method of bicycle ergometry: the persons under experiment performed two loads of 5 minutes each with a rest interval of 3 minutes on a bicycle ergometer (Smart Bike BC7300), the frequency of pedaling in both cases was 60 rpm. The power of the first load was set at a rate of 1 W (6 kgm·min^{-1}) per 1 kg of the body weight of the person under experiment, the second - 2 W (12 kgm·min^{-1}) per 1 kg of the body weight. The heart rate (HR) was fixed at the end of the first and second loads. PWC_{170} was calculated according to the formula (V.L. Karpman, 1987): $PWC_{170} = N_1 + (N_2 - N_1) \times (170 - f_1) / (f_2 - f_1)$, where N_1 and N_2 - power of the first and second loads (kgm·min^{-1}), f_1 and f_2 - heart rate at the end of the first and second loads, respectively (beats·min^{-1}); *maximum oxygen consumption VO_{2max}* (characterizes aerobic performance, was determined by the indirect method, taking into account the linear relationship between VO_{2max} and PWC_{170} by the formula (V.L. Karpman, 1987): $VO_{2max} = 1{,}7 \cdot PWC_{170} + 1240$. The relative index VO_{2max} was determined on the basis of 1 kg of the body weight of the person under experiment).

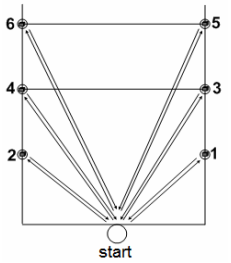


Fig. 1. Scheme of the "herringbone" run test

The purpose of the formative stage of the experiment was to justify the construction of the structural units of the training process of the qualified volleyball women players within the preparatory period of the annual training cycle on the basis of modeling. To achieve this goal, we implemented the following:

1) development of the model training tasks (algorithmic logically related complexes of exercises aimed at achieving the set goal, with strict regulation of the load components) for the various parts of the training of the qualified volleyball women players, taking into account the optimal parameters of the training load (the nature and duration of the individual exercises, modes of coordination complexity (MCC)[1], load rate (LR)[2]) for the directional improvement of the various fitness components;

2) planning of the model training tasks, which formed the basis of the training session, in the structure of microcycles in order to form urgent, delayed and cumulative training effects by sportswomen;

3) pedagogical control and timekeeping of training of the qualified volleyball women players to determine the content of the preparatory period (ratio of multi-directional means and loads) when constructing the training process based on modeling;

4) pedagogical testing of the indicators of sportswomen's fitness at the beginning and at the end of the preparatory period for comparing the results with the summative stage and substantiating the effectiveness of constructing the training process of the volleyball women players on the basis of modeling.

Statistical analysis. In the mathematical treatment of the results of the study the descriptive statistics were used: the following values were defined: arithmetic mean, mean square deviation, standard error of the arithmetic mean. The parametric criterion of Student (significance level a = 0.05) was used to determine the true difference between the indicators. Preliminary the samples were checked for compliance with the normal distribution of measurement results using Shapiro-Wilky criterion. The mathematical processing of the results of the study was conducted using MS Excel software packages.

Results.

Model training tasks (MTT) were developed and planned to optimize the training process by creating urgent, delayed and cumulative training effects, that's why the results of the basic researches of L. Matveev (2010), V. Platonov (2013), I. Wilmore, D. Costill, L. Kenney (2012) became the basis for their drafting. The

[1] There are three modes of coordination complexity (V. Kostiukevych et al, 2017, 2018): 1st MCC - exercises are performed in place or at the convenient speed of movement, 2nd MCC - exercises are performed in motion with restrictions in space and time, 3rd MCC - exercises are performed in conditions of counteraction by the opponent

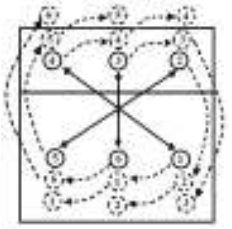
[2] The load rate was calculated as the product of the exercise duration on its intensity in points, depending on the heart rate (M.A. Godik, 2006; V. Kostiukevych et al, 2017): intensity of the exercise with heart rate of 114 beats per minute (bpm) was estimated with 1 point; 120 bpm - 2 points; 126 bpm - 3 points; 132 bpm - 4 points; 138 bpm - 5 points; 144 bpm - 6 points; 150 bpm - 7 points; 156 bpm - 8 points; 162 bpm - 10 points; 168 bpm - 12 points; 174 bpm - 14 points; 180 bpm - 17 points; 186 bpm - 21 points; 192 bpm - 25 points; 198 bpm - 33 points

structure of the training sessions consisted of model training tasks for general and special physical, technical and tactical, as well as game training of the skilled volleyball women players (N.Yu. Shchepotina, 2017). In general, each MTT contained the content, step by step exercise performance and load components (Table 1). The developed coding system of model training tasks provided their short entry in the microcycle model (Table 2).

Thus, the structural units of the training process of the qualified volleyball women players were constructed on the basis of model training tasks, which became the basis for studying the content of the preparatory period of the first macrocycle in two-cycle model of training. The duration of the preparatory period of the qualified volleyball women players at the stage of the formative experiment was 70 days during which the retraction, basic developmental, control preparatory and pre-competition mesocycles were planned, the content of which in relation to the ratio of means and loads of the different physiological orientation is reflected in Table 3.

Table 1

Model training task for technical and tactical training of the qualified volleyball women players

Model training task content	**Title:** Lead-up exercises in 2nd MCC. **Model training task code:** MTT: TTT. 3. **Aim**: to improve the technique of the protective action and spatial orientation of the players. **Model training task duration**: 10 minutes. **Physiological direction of loading**: mixed aerobic and anaerobic power supply mode (9 min). **Means**: lead-up exercises in 2nd MCC (9 min). **Load rate (points)**: 73.5. It is advisable to use model training task in the main part of the training session at the special preparatory stage of the annual training cycle. **Symbols:** ③– players; ⟶ – ball path; – moving of the player	

Algorithm	Contents of individual steps of the model training task	*Load components*				
		t, min	*MCC*	*IR, sec*	*HR, bpm*	*LR, points*
step 1	Six players are placed in zones on one side of the volleyball court, forming pairs: 1 and 4 zones, 2 and 5 zones, 3 and 6 zones: work "in defense" in pairs.	3	2	30	150 – 162	24
step 2	The same as step 1, only the players move to one zone clockwise.	-	-	30	-	24
step 3	Repeat step 2.	-	-	-	-	24
step 4	Walking. Breathing exercises.	1	1	-	114 – 120	1,5

Notes: t – duration of exercises; MCC – modes of coordination complexity; IR – interval of rest; HR – heart rate; LR – load rate

Table 2

Model of the first striking microcycle (fragment) of the qualified volleyball women players training at the stage of the formative experiment (control-preparatory mesocycle of the preparatory period of the first macrocycle)

Training means, min			Training days		
			1st	2nd	3rd
Non-specific	GPT	RE	**1** 6′ (MTT: RE.3)	**1** 3′ (MTT: RE.6)	**1** 3′ (MTT: RE.6)
		Str.	**2** 5′ (MTT: Str.2) **8** 6′ (MTT: Str.5)	**2** 5′ (MTT: Str.1) **9** 4′ (MTT: Str.5)	**2** 6′ (MTT: Str.2) **7** 5′ (MTT: Str.5)
	SPT	ST	**3** 13′ (MTT: PT.7)	-	-
		SFT	-	**3** 16′ (MTT: PT.10)	**3** 15′ (MTT: PT.19)
		D	**4** 13′ (MTT: PT.20)	-	-
Specific	STE	SSFT	**6** 11′ (MTT: PT.13)	-	-
		SE	-	-	**5** 18′ (MTT: PT.15)
		SCT	-	**6** 17′ (MTT: TTT.1)	-
		SST	-	**5** 16′ (MTT: PT.12)	-
	LE	1st MCC	**5** 6′ (MTT: TTT(I).5)	**4** 6′ (MTT: TTT(I).5)	-
		2nd MCC	-	**7** 8′ (MTT: TTT.14)	**4** 13′ (MTT: TTT.25)
		3rd MCC	-	**8** 15′ (MTT: TTT.10)	-
	CE	GT	**7** 30′ (MTT: GT.4)	-	**6** 30′ (MTT: GT.4)
Duration, min / LR, points			90 / 763	90 / 826	90 / 756

Notes: Means: GPT - general physical training, SPT - special physical training, STE - special training exercises, LE – lead-up exercises, CE - competitive exercises; RE – run exercises; Str. - stretching; ST - speed training; SFT - speed-force training; D - dexterity, coordination abilities; SSFT - special speed-force training; SE - special endurance; SCT - special coordination training; SST - special speed training; MCC - modes of coordination complexity; GT - game training; LR - load rate; record **7** 30′ (MTT:GT.4)*, where, 7 - the serial number of the certain MTT application in the training session; 30 ' - MTT duration (min); MTT: GT. 4 - MTT code*

The retractable mesocycle consisted of two retractable microcycles. In the training process, low-intensity model training tasks were used, aimed at gradually developing the systems of sportswomen organism and preparing them for heavy loads. The basic developing mesocycle consisted of two striking and one recovery microcycles. In this mesocycle, model training tasks for creation of the foundation for technical fitness prevailed, as well as the proportion of model training tasks for improvement of the special physical fitness significantly increased. Control-preparatory mesocycle consisted of two striking and one recovery microcycle. According to the main tasks, increase in the proportion of model training tasks for special physical and game training was planned in this mesocycle to maintain the level of fitness and facilitate adaptation to the competitive loads. The total amount of the training loads and the total load rate in the control-preparatory mesocycle, in comparison with the previous one, practically did not change, indicating stabilization of the applied loads. The preparatory period was completed by pre-competition mesocycle, which consisted of two lead-up and one recovery microcycle. The main attention was focused on maintaining the level of special fitness and further improving of the technical and tactical skills and preparing for the main competitions. The characteristic feature of the pre-competition mesocycle was the largest in the preparatory period number of the control games.

Table 3

Contents of the training process of the qualified volleyball women players in the preparatory period of the first macrocycle at the stage of the formative experiment

Mesocycles	Relation of the means and loads of training, %									Total duration, min	Load rate, points
	Means					Physiological direction of loading					
	Non-specific		Specific								
	GPT	SPT	STE	LE	CE	A	MAA	AA	AG		
Retractable	63,5	18,9	-	17,6	-	79,0	18,3	2,7	-	800	4640
Basic developing	23,5	18,5	8,6	36,3	13,1	42,1	42,8	9,3	5,8	1350	10600
Control-preparatory	17,8	13,4	15,6	32,8	20,4	32,3	50,3	10,6	6,8	1320	10693
Pre-competition	17,8	8,0	12,2	32,2	29,8	27,8	61,6	6,8	3,8	1375	10927
Total in the preparatory period	26,9	14,2	10,1	31,1	17,7	41,5	46,2	7,8	4,5	4845	36860

Notes: Means: GPT - general physical training, SPT - special physical training, STE - special training exercises, LE – lead-up exercises, CE - competitive exercises; Physiological direction of loading: A - aerobic power supply mode, MAA - mixed aerobic-anaerobic power supply mode, AA - anaerobic alactatic power supply mode, AG - anaerobic glycolytic power supply mode

In general, in mesocycles of the preparatory period there was a general trend towards the gradual decrease in the proportion of non-specific means and increase of the specific ones until the end of the period (82,4% in the retracted mesocycle up to 25,8% in pre-competition period), gradual reduction of the loads in the aerobic mode power supply (from 79,0 up to 27,8%) and increase in the mixed (from 18,3 up to 61,6%) and anaerobic (from 2,7 up to 17,4%) ones, which was conditioned by the predominant use of model training tasks for general physical training at the beginning with the gradual decrease by the end of the preparatory period. At the same time, the number of model training tasks was increased for special physical, technical and tactical and game training. It should be noted that, firstly, a slight increase in physical activity in the preparatory period at the formative stage of the experiment, compared with the summative one (from 4615 to 4845 min), and at the same time, their number reduced (from 37398 to 36860 points) which contributed to reducing the intensity of the training process. Secondly, the ratio of the means of preparation was changed (Fig. 2). In particular, during the preparatory period at the formative stage of the experiment, compared with the summative one, as recommended by the experts (T.O. Bompa, G.G. Haff, 2009; O. Shynkaruk, 2012; V. Platonov, 2013), the number of means of the general physical preparation was reduced mainly by reducing their scope in the striking and lead-up microcycles. In addition, the number of the special physical training and special training exercises was increased with the aim to improve the volleyball sportswomen physical qualities.

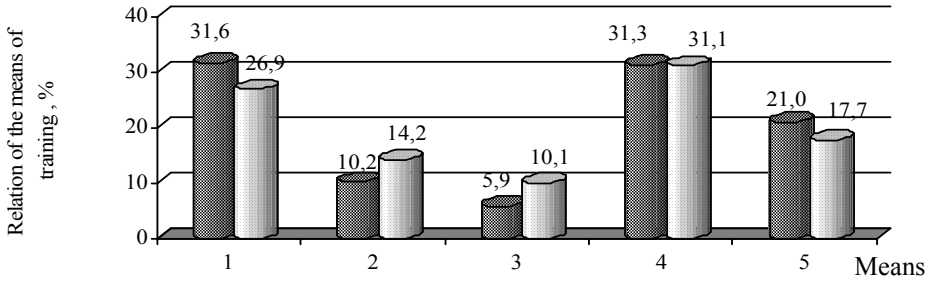


Fig. 2. Relation of the means of training of the qualified volleyball women players in the preparatory period of the first macrocycle at the summative and formative stages of the experiment:

1 - general physical training means; 2 - special physical training means; 3 - special training exercises; 4 – lead-up exercises; 5 - competitive exercises; ⚄ - summative stage; ⚀ - formative stage

The designated differences in construction of the training process in the preparatory period were as authentic and functional improvement in physical fitness of the skilled volleyball women players at the formative stage of the experiment (Table 4). In addition, the higher intensity of the training loads at the summative stage of the experiment on the one hand, and the use of a significant proportion of the general physical training facilities and a significantly lower proportion of special-preparatory and special-physical means of training, on the other hand, turned out to be insignificant ($p>0,05$) improvement of indicators of physical and functional fitness of sportswomen during the preparatory period (Table 4). This confirms the need to optimize the volumes and number of training loads, as well as redistribution of the hours spent on physical training in the direction of increasing the number of special and reducing the general physical training, in accordance with the tasks of the stage of preparation for high performance sport (T.O. Bompa, G.G. Haff, 2009; V. Platonov, 2013).

Table 4

Indicators of the functional and physical fitness of the qualified volleyball women players (n = 16) on the summative (SS) and formative (FS) stages of the experiment

Indicators of the functional and physical fitness	Stages of the experiment	Pedagogical testing		$\Delta \bar{x}$, %	p
		Retractable mesocycles	Pre-competition mesocycles		
		Statistical values of indicators ($\bar{x} \pm m$)			
Vital lung capacity, l	SS	2,77±0,07	2,84±0,07	+2,5	>0,05
	FS	2,78±0,06	2,89±0,04	+4,0	<0,05
PWC_{170}, kgm·min^{-1}	SS	876,89±29,06	891,28±26,22	+1,6	>0,05
	FS	873,65±24,31	924,59±24,24	+5,8	<0,05
VO_{2max}, ml·min^{-1}	SS	2730,71±49,40	2755,18±44,57	+0,9	>0,05
	FS	2725,20±41,33	2811,80±42,21	+3,2	<0,05
VO_{2max} relative, ml·min^{-1}·kg^{-1}	SS	44,22±0,84	44,55±0,96	+0,8	>0,05
	FS	43,66±0,79	45,30±0,83	+3,8	<0,05
Standing long jump, m	SS	1,93±0,04	1,95±0,04	+1,0	>0,05
	FS	1,94±0,03	1,99±0,03	+2,6	<0,05
Standing high jump, m	SS	0,405±0,009	0,413±0,010	+2,0	>0,05
	FS	0,408±0,007	0,422±0,006	+3,4	<0,05
“Herringbone” run, sec	SS	28,28±0,45	28,00±0,45	-1,0	>0,05
	FS	28,02±0,42	27,56±0,41	-1,6	>0,05

Discussion.

Analysis and comparison of the received data with the results of the previous studies (E.Iu. Doroshenko, 2013; Y. Imas et al, 2017; V. Kostiukevych et al, 2017, 2018) allows to state that, taking into account the modern trends in team sports, modeling of the training process of the qualified volleyball women players is an effective and promising direction for improving training of sportswomen. Unlike the traditional planning, modeling involves creation of the target models of the structural units of the training process and, most importantly, regulation of the load components, which is extremely important for optimizing training of the players. Thus, in our study there was not only theoretical and methodological bases of modeling of the training tasks and occupations, micro- and mesocycles of the preparatory period of the annual cycle of training of the qualified volleyball women players presented, but also the mechanism of realization of the certain provisions in practice was proposed. As a result, construction of the structural units of the training process based on the developed modeling training tasks with their accentuated use in planning and implementation of the managerial influences in the process of increasing the various aspects of fitness of the qualified volleyball women players has been substantiated experimentally. Therefore, the proposed model training tasks, which constitute the structure of the training sessions, micro- and mesocycles, are the alternative to the traditional plan-summary, and these data can be attributed to new ones, which extend the idea of the approach to modeling of the training process in gaming sports, including volleyball.

The characteristic feature is the use of the integrated approach to modeling the structural units of the training process of the qualified volleyball women players, since the models of the training tasks and occupations, micro and mesocycles were not limited to accentuated influence on the separate sides of preparation. In comparison with the previous studies (S.S. Yermakov, 2010; M. Stech, J. Skrobecki, K. Wnorowski, 2012; E. Iu. Doroshenko, 2013; Y. Imas et al, 2017), model training tasks were developed for various aspects of fitness - general and special physical, technical and tactical as well as game, and their contents consisted of multidirectional means and physical activity.

The data obtained as a result of our study supplements and expands the existing information on the content of the preparatory period for sportswomen of the team games-based sports. Thus, in particular, the experts in the theory and practice of sports point out that one of the main tasks solved in the process of sports

training is to provide the appropriate level of the capabilities of the functional body systems that receive the main load in this sport (L. Matveev, 2010; V. Platonov, 2013; I.H. Wilmore, D.L. Costill, L.W. Kenney, 2012). Consequently, taking into account the numerous studies on the physiological orientation of the competitive loads in sports games (I.H. Wilmore, D.L. Costill, L.W. Kenney, 2012; V. Platonov, 2013), including volleyball (M. Lehnert, 2008; E. Spooner, 2012; R. Gamble, 2013), which are carried out mainly in the mixed aerobic and anaerobic mode of energy supply, it is necessary to use a significant proportion of the training loads of mixed orientation in the process of training of the qualified volleyball players (L. Airapetiants, 1982; V. Holub, 1993), at the same time reflecting our research.

In addition, in the studies of V. Shamardin (2013), V. Kostiukevych (2013), I. Stasiuk (2013) it is recommended to use a significant proportion of the aerobic directional loads in the preparatory period, in addition to the loads in the mixed mode of energy supply, which, on the one hand, provides enhancement of the ability of sportswomen to transfer significant volumes of the physical activity in the process of training and competitive activities, and on the other hand, contributes to improving the technical and tactical skills of the players. This position is confirmed by our researches, as the analysis of the content of the preparatory period of the qualified volleyball women players showed the use of aerobic and combined aerobic and anaerobic loads in the training process. However, taking into account the specifics of the volleyball game activity, which does not include significant running loads, but involves jumping work, it is also advisable to use a significant proportion of the loads of anaerobic orientation in the training process of sportswomen during the preparatory period.

The obtained results confirm that according to the theory of periodization the preparatory period (L. Matveev, 2010; V. Platonov, 2013) corresponds to the stage of formation of the competition form of the players. The rational use of the means and loads in the training process of the qualified volleyball women players aimed at creating the foundation of functional fitness, versatile development of physical qualities, technical and tactical training, which turned out to be a significant increase in the results of testing sportswomen, evidence about that. In general, indicators of the functional and physical fitness do not contradict the previous researches (M. Stech, J. Skrobecki, K. Wnorowski, 2012; T. Jurković, N. Marelić, T. Resetar, 2014; A.N. Malikova et al, 2018) and supplement them.

Conclusions

Analysis of the special literature showed the need to find a rational way to manage the process of training sportswomen focused on optimizing the training effects, taking into account the specifics of the team games-based sports and stages of the macrocycle. One of the promising ways of optimizing the training in sports games is modeling, which allows to create models of the structural units of the training process with the regulation of the load components, optimal for the directional improvement of the various components of fitness.

The peculiarity of constructing the preparatory period for the qualified volleyball women players at the formative stage of the experiment is that model training tasks, which formed the structure of the training sessions, micro- and mesocycles, were developed and planned to optimize the training process by forming urgent, delayed and cumulative training effects. Construction of the structural units of the training process on the basis of the developed model training tasks with accentuating their use in planning and implementation of the managerial influences in the process of increasing the different sides of fitness of the qualified volleyball women players became the basis for studying the content of the preparatory period of the first macrocycle in two-cycle model of training.

Reducing the intensity of the training process in the preparatory period and the redistribution of loads in the direction of increasing the number of special training and special training exercises, as well as reducing the means of general physical training at the formative stage of the experiment, compared with the summative one, contributed to a significant improvement in the functional performance of the qualified volleyball women players, as well as the manifestation of their physical qualities, indicating the effectiveness of the implemented model training tasks.

The perspectives for further researches are seen in the study of the effectiveness of the use of modeling in the construction of the structural units of the training process of sportswomen of the team games-based sports at the different stages of both annual and multi-year training.

Conflict of interest. The authors state that there are no conflicts of interest.

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