

**DIFFERENTIATION OF LOADS IN THE BASIC MESOCYCLE  
ACCORDING TO SPECIAL PHYSICAL READINESS IN YOUNG  
WEIGHTLIFTERS 14-15 YEARS OLD, TAKING INTO ACCOUNT THE  
PHASES OF A SPECIFIC BIOLOGICAL CYCLE**

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**Purpose:** to determine the effectiveness of using complexes of strength-oriented exercises in the basic mesocycle according to the special physical readiness of young weightlifters of 14-15 years old, taking into account the phase of the ovarian-menstrual cycle.

**Material and methods:** in accordance with the methodological approach to solving the problem and the set tasks, the research program included a set of methods: analysis of scientific and methodological literature, determination of special physical fitness with the help of pedagogical testing of young women weights, pedagogical observation of the training process and methods of mathematical statistics.

**Results:** modern approaches are presented regarding the peculiarities of building the training process of young weightlifters of 14-15 years old, a detailed structure of building a basic mesocycle according to SPP is presented, taking into

account the differentiation of the load of special power-oriented complexes in different phases of the ovarian-menstrual cycle. The experiment involved the control and experimental groups, in which they used different approaches to planning the training process and the peculiarity of which is that in the experimental group special complexes of strength preparedness were used, taking into account the efficiency in different phases of the OMC.

**Conclusions:** the introduction of the methodology of the training process of young weightlifters of 14-15 years old in the basic mesocycle of the annual macrocycle, taking into account the phases of the ovarian-menstrual cycle, contributed to a significant increase in the indicators of general and special-auxiliary exercises in the experimental group in relation to the control one in the snatch of 8 kg kettlebells in 10 min ( $t = 2.15$ ;  $p < 0.05$ ) in squatting with a 24 kg kettlebell on the shoulders by 10.2 times ( $t = 2.28$ ;  $p < 0.05$ ) and deadlift - by 6.7 times ( $t = 2.25$ ;  $p < 0.05$ ).

**Keywords:** young athletes, specific biological cycle, OMC phases, microcycles, mesocycles.

## **Introduction**

Modern sport is characterized by a steady increase in sports achievements, accompanied by an increase in the volume and intensity of the training load. Such an approach to the training process often leads to overstrain of regulatory systems, depletion of the adaptive reserve and shortening of the performance time of athletes, does not allow achieving high sports results. The functioning of physiological systems and adaptation processes in the body of women differ from those in men. This is due to one of the main biological characteristics of the female body associated with reproductive function - the cyclic functions of the hypothalamic-pituitary-ovarian-adrenal system. A number of studies (A. G. Radzievsky, 1990; F. A. Iordansky 2012; V. V. Mulik 2001; 2016; L. Ya. - G. Shakhlina, 1995-2014) [3-5; 12-14], including foreign ones (A. M. Burrows, S. R. Bird, 2005; S. B da Silva, 2006; A. J. Anderson, M. A. Babcock, 2008) [16-22], is devoted to the influence of sex

hormones in the system of women's sports training. Experts have established the dependence of the manifestation of the working capacity of athletes of various sports specializations and the reaction of their body depending on the change in the concentration of sex hormones during the menstrual cycle (MC) (A.G. Radzievsky, 1990; L. Ya.-G. Shakhlina, 1995–2014) [4; 9;10].

**Purpose of the study** is to determine the effectiveness of using complexes of strength-oriented exercises in the basic mesocycle from the special physical readiness of young weight-lifters 14-15 years old, taking into account the phase of the ovarian-menstrual cycle.

### **Material and Methods of research**

According to the methodological approach in solving the problem and the set tasks, the research program included a set of methods: analysis of scientific and methodological literature, determination of special physical preparedness with the help of pedagogical testing of young weight-lifters, pedagogical observation of the training process and methods of mathematical statistics.

The research involved young pupils of the Children's and Youth Sports School No. 16 and Sports School No.8, Kharkov. The experiment involved 22 young athletes weight-lifters 14-15 years old, who were divided into two groups: control and experimental, 11 athletes in each group. The participants of the experiment trained six times a week, the control group – according to the sports school program, the experimental group trained according to the developed method using the load of prisoners depending on the phases of the OMC.

The experiment was carried out at the educational and training base of Sports School No. 8 and Children's and Youth Sports School No. 16.

### **Results of the research**

Sports training of young female athletes involved in kettlebell lifting provides for the use of means and methods that affect the development of such physical qualities as strength, strength endurance and speed-strength training. Under the influence of training, the athlete's body undergoes certain changes. In the process of adaptation to physical activity, the level of physical performance and fitness of

athletes increases. One of the manifestations of the body's adaptation to power manifestations is muscle hypertrophy. However, in order for the changes in the body of female athletes to have a positive character, the coach must choose the optimal regimen and develop a training complex during the ovarian-menstrual cycle and choose the right rest, recovery procedures, contribute to a faster growth of sportsmanship (V. Mulik, 2001; V. M. Platonov, 2004; M. S. Prudnikova, 2009;) [4; 9; 10].

At that time, to date, there are no studies on the construction of an annual macrocycle of training young female athletes involved in kettlebell lifting, taking into account the ovarian-menstrual cycle. Sports training involves the use of means and methods of training aimed at improving the level of development of physical qualities. Long-term exposure to stress on the body causes changes in the functional state of the organ systems (respiratory), and as a result, the overall level of preparedness and physical performance increases. However, in order for the influence of sports to have a positive character, the coach must select an adequate level of load, taking into account the phases of the ovarian-menstrual cycle, taking into account the individual characteristics of female athletes [3; 4; 5 ;6; 7].

Taking into account the recommendations of leading experts in the field of construction of training process of preparation of athletes (B. Platonov, 2004; VV Mulik 2017) [4-5; 8-9], it is reasonable to construct a two-cycle annual training of young athletes involved in kettlebell lifting, taking into account the specialty of the OMC during a one-year macrocycle.

In our study, the construction of a one-year macrocycle for training young athletes is based on the generally accepted theory of periodization (V.M. Platonov), which provides for the division of the macrostructure into preparatory, competitive and transitional periods, and when menarche appears, we have introduced a developed experimental technique for constructing a basic mesocycle (basic on SPP) in the preparatory period, developed taking into account the phases of the ovarian-menstrual cycle (Tables 1, 2).

Table 1

**The content of the training program of young female weight-lifters 14-15 years old from the control and experimental groups in the basic mesocycle with SPP, taking into account the ovarian-mental cycle**

Indicators of training loads and classification of muscle groups	Mesocycle									
	Basic SPP									
	Retracting		Shock		Leading		Shock		Retracting	
	Menstrual		Post menstrual		Ovulatory		Post ovulatory		Before menstrual	
	CG	EG	CG	EG	CG	EG	CG	EG	CG	EG
Load range as a percentage of maximum.	80	50	90	85	60	30	90	100	70	55
Number of training days	6	4	8	11	6	2	10	12	6	5
Number of repeats	88	62	96	105	75	42	102	110	90	60
Number of attempts	5	3	5	5-6	3	2	5	6	5	3
Exercise time, min, s										
Kettlebell snatch	10	6	10	10	8-10	3-4	10	10	8	5
Kettlebell push	10	7	10	10	8-10	3-4	10	10	8	6
Pauses between repeats, s	0,5	1,0	0,5	0,5	0,6	1,2	0,5	0,4	0,6	0,9
Rest between attempts, min										
In competitive exercises	5	8	6	6	6	10	5	5	5	7
In specially assisted exercises	3	5	4	4	6	10	4	3	3	5
Number of muscle groups training in the OMC phases										
Thigh muscles	3	2	4	5	2	1	5	6	3	2
Back muscles	4	2	3-4	5	2	1	4	7	3	3
Pectoral muscles	2	2	3	4	2	1	4	4	2	2
Deltoid muscles	2	2	4	5	2	1	5	6	2	2
Biceps muscle	1	2	2	2	2	1	3	4	2	2
Three-headed muscle	3	2	4	5	2	1	4	6	3	3
Forearm muscles	2	2	5	6	2	1	4	7	2	2
Abdominal muscles	3	0	5	6	2	1	8	10	3	2

*CG - control group; EG - experimental group*

The total amount of loads in the basic mesocycles did not have a significant difference between the groups ( $p > 0,05$ ).

The proposed approach to planning in the annual macrocycles of the basic mesocycle for young female athletes weight-lifters, taking into account the phases of

the ovarian-menstrual cycle, modified from the works of V.V. Mulik (2017). Table 1 shows a more detailed content of the training process in the preparatory period of the basic mesocycle on SPP. The experimental group trained for five microcycles (retraction, shock, leading, shock, retraction) of the basic mesocycle, using in each phase of the OMC a set of strength exercises was developed, in which the load on different muscle groups varies (Table 1).

The proposed methodology, according to which young female athletes of the experimental group were trained in the basic mesocycle according to the SPP of the preparatory period, consisted in the correctness of the training burden when planning the course of the basic mesocycle, which took into account the differentiation of the number of kettlebell lifts (NKL), as well as in kilograms and tons, which is shown in Table 2. All data shown in the table are average values.

*Table 2*

**The total volume of training work performed by young female weightlifters 14-15 years old from the control and experimental groups in the basic mesocycle on SPP taking into account the ovarian-mental cycle**

Indicators of training work	Mesocycle									
	Basic SPP									
	Retracting		Shock		Leading		Shock		Retracting	
	Menstrual		Post menstrual		Ovulatory		Post ovulatory		Before menstrual	
	CG	EG	CG	EG	CG	EG	CG	EG	CG	EG
<b>Competitive exercises</b>										
Kettlebell snatch, NKL	440	248	480	630	375	84	510	660	450	180
Kettlebell snatch volume, kg	7040	3968	7680	10080	6000	1344	8160	10560	7200	2880
Kettlebell push, NKL	320	150	350	350	150	62	390	410	280	120
Kettlebell push, volume, kg	10240	4800	11200	11200	4800	1984	12480	13120	8960	3840
<b>Special preparatory exercises</b>										
Squat with a kettlebell 24 kg, NKL	290	96	330	450	165	84	510	660	450	180
Squats with kettlebell 24 kg, volume, kg	6960	2304	7920	10800	3960	2016	12240	15840	10800	4320

Continuation of Table 1

Deadlift with a kettlebell of 24 kg, NKL	240	66	280	390	105	24	310	420	250	60
Deadlift with a kettlebell 24 kg, volume, kg	5760	1584	6720	9360	2520	576	7440	10080	6000	1440

CG - control group; EG - experimental group; NKL - number of kettlebell lifts; KG - kilograms

In the basic SPP mesocycle, much attention was paid to competitive exercises, therefore the total volume was 63 thousand 776 kilograms, the most attention was paid to the snatch exercise, since it is the first competitive exercise, as well as specially preparatory exercises, which amounted to the NKL 2 thousand 430 lifts, since the task of this the mesocycle was to construct a harmonious distribution of loads among the five phases of the CMC. In turn, the female athletes of the control group trained, not taking into account the differentiation of the load in different phases and achieved results in competitive exercises, respectively, 83 thousand 760 kilograms.

As a result of the use of the author's methodology of the developed complex of the training process among female weight-lifters of 14-15 years old in the basic mesocycle on SPP of the preparatory period of the annual macrocycle, taking into account the specific biological cycle, significantly better results of the test indicators of young weight-lifters of the experimental group were obtained (Table 3)

Table 3

**Indicators of competitive and special-preparatory exercises of female weight-lifters in the control (CG, n = 11) and experimental (EG, n = 11) groups at the beginning and at the end of the experiment  $\bar{X} \pm m$**

Indicators		Groups of athletes		t	p
		CG	EG		
Snatch of a kettlebell 8 kg in 10 minutes, number of times	before	52,2±2,9	51,0±2,5	0,34	>0,05
	after	77,0±3,4	88,5±2,9	<b>2,57</b>	<b>&lt;0,05</b>
Squats with kettlebell 24 kg, number of times	before	12,1±2,8	12,8±2,2	0,19	>0,05
	after	27,9±3,0	38,1±3,3	<b>2,28</b>	<b>&lt;0,05</b>
Deadlift with a kettlebell 24 kg, number of times	before	36,4±2,2	37,3±2,4	0,27	>0,05
	after	52,6±2,3	59,9±2,1	<b>2,25</b>	<b>&lt;0,05</b>

As a result of the use of the author's methodology of the used complex of strength exercises among 14-15 year old female weight-lifters with a differentiating approach in each of the phases of the OMC, the female weight-lifters of the experimental group showed significantly better results of tests of competitive and special-preparatory exercises ( $p < 0,05$ ).

The increase in test results in a weight-lifters in the experimental group was higher in: snatch of a kettlebell by 7,8 times ( $t = 2,15$ ;  $p < 0,05$ ) in a squat exercise with a 24 kg kettlebell on the shoulders by 10.2 times ( $t=2,28$ ;  $p<0,05$ ) and deadlift – by 6,7 times ( $t=2,25$ ;  $p<0,05$ ) (Table 3).

Thus, a comparative analysis of the indices of competitive exercises and special physical fitness of female athletes in the control and experimental groups at the beginning and at the end of the experiment showed that the level of special physical fitness of athletes in the experimental group significantly increased under the influence of the proposed methodology, in which the developed complexes of strength exercises were used that differentiate load in different phases of the ovarian menstrual cycle in a female weight-lifters 14-15 years old.

### **Conclusions / Discussion**

The analysis of the scientific literature testifies to isolated studies in kettlebell lifting. In recent years, scientists have conducted research on the content and methodology of the training process of young female weight-lifters 14-15 years old with various methods of developing motor skills and strength qualities (Yu.V. Verkhoshansky 2013), planning the training process during the annual macrocycle of athletes 14-15 years (V. Platonov, 2014, 2015) and the influence of the training process of young athletes-kettlebell athletes 14-15 years old on the manifestation of physical qualities (M.S. Ipolitov). However, the influence on the working capacity of physical loads of young female weight-lifters of 14-15 years old during a specific biological cycle has not yet been determined and, in accordance with this, the planning of training loads.

The conducted research confirmed the results of other authors [1, 2] about the need to take into account the influence of training on the physical indicators of



female athletes aged 14-15 at the stage of initial training. Also, the data of domestic [4-5; eight; nine; 11] and foreign [16-22] authors on the issues of increasing the level of the most significant indicators of physical qualities on the body of young athletes involved in kettlebell lifting.

Today, there is a number of scientific studies that consider the issues of the peculiarities of building the training process of female athletes based on taking into account the working capacity in different periods (phases) of a specific biological cycle. The works of A.R. Radzievsky, Yu.T. Poholenchuk, N.V. Svechnikov, B.P. Pangelova, T.A. Lozy, S.K. Fomina, A. Ya. Kvale, Yu.A. Karp, L.Ya.-G. Shakhlin, who determined the functional state of female athletes during a specific biological cycle. The issues of building the training process of young athletes have been studied to a lesser extent, especially during the formation of a specific biological cycle.

The introduction of the methodology of the training process of young female weight-lifters 14-15 years old in the basic mesocycle of the annual macrocycle, taking into account the phases of the ovarian-menstrual cycle, contributed to a significant increase in the indicators of general and special-auxiliary exercises in the experimental group in relation to the control one in the snatch of 8 kg kettlebells in 10 minutes ( $t=2,15$ ;  $p < 0,05$ ) in squatting with a 24 kg kettlebell on the shoulders by 10,2 times ( $t=2,28$ ;  $p < 0,05$ ) and deadlift - by 6.7 times ( $t=2,25$ ;  $p < 0,05$ ).

**Prospects for further research** envisage the determination of the construction of the training process of young female weight-lifters 14-15 years old in separate mesocycles, taking into account the phases of the OMC during the annual macrocycle.

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