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Original Article

Basic mesocycle construction specifics of female athletes, who specialize in medium distance running, by taking into account female body peculiarities

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Abstract:
Training process basic mesocycles' construction specifics of women, specializing in 800 m and 1500 m running, according to the functional state in the various phases of the menstrual cycle (MC), has been substantiated, which increased their special efficiency.**Methods**: analysis and generalization of scientific and methodological literature; questionnaire; pedagogical experiment; medical and biological methods, and methods of mathematical statistics.13 women, who specialize in 800 m and 1500 m running, aged 17-24, and who qualified as candidates for Masters of Sport (MS) of first and second class, participated in this survey. The state of health of all athletes was within the limits of the physiological norm.**Results.**Using MC as a natural biological model, mesocycles were built, taking into account the MC phases of female athletes. In the postmenstrual and postovulatory phases of the MC, when the special efficiency is high, high-impact microcycles have been planned, and restorative microcycles – in the premenstrual, menstrual and ovulatory phases, when the special capacity was reduced.In the postmenstrual (6 - 12 daysof MC) and post-ovulatory (16 - 26 daysof MC) phasesof MC, when special performance is high, shock microcycles were planned, and in premenstrual (27 - 28 daysof MC), menstrual (1 - 5 daysof MC) and ovulatory (13 - 15 days MC) phase, when special performance was reduced – restorative microcycles. In the first recovery microcycle (premenstrual and menstrual phases of MC), the volume of running load was 33 km; in the second shock microcycle (postmenstrual phase MC) the total volume was - 46.2 km; in the ovulatory phase, we plan a short III recovery microcycle with a total volume of 15.6 km; in the IV shock microcycle (post-ovulatory phase of the MC) athletes performed the largest load - 58.8 km; in the V shock microcycle (post-ovulatory phase of the MC) the amount of running load was 38.8 km.**Conclusion.** The redistribution of training loads according to the volume and intensity, taking into account the functional capabilities of the female athlete's body in different phases of the MC, makes it possible to carry out the planned load in the mesocycle. Application of the proposed basic mesocycles in the training process of female athletes, specializing in medium distances running, taking into account changes in the functional state of their body during the MC, has made it possible to significantly improve their outcome in the competitions.
Key words: training process, competitive activity, functional status, menstrual cycle.

Introduction.

The question of optimal construction and improvement of the athletes' training process, taking into account their functional state, becomes of increasing importance. In modern sports, the growth of sports achievements is accompanied by an increase in the volumes and intensity of the training load, which often leads to the regulatory systems' over strain, the depletion of the adaptation reserve and shortening the timing of female athletes' performances, and the inability to achieve high sports results (Adamchuk, V. 2019;Stepinski M. etal., 2020; Romanenko V. etal., 2018,Davydov V. etal.,2019;Savolaynen O. 2019; Davydov V. etal.,2018; Palatnyy A. 2018;GalytskaA. 2017). A significant number of V.N.Platonov studies are devoted to this topic research, 2013.

Women sports trainings are often conducted under the men training program. Functional systems, adaptive processes in the woman body significantly differ from those in men (Roda O. 2014; Roda O. etal.,2017; Miroshnichenko V. etal., 2018; Voronova V.etal.,2019; Davydov V.etal.,2019). This is due to one of the main biological features of the female body, associated with the reproductive function, which is accompanied by significant changes in the hormonal status, causing various functionalities, changes in general and special ability to work in different phases of the menstrual cycle. A number of studies by L.Shakhlina (2016-2018); S.Kalytka (2014-2018); O. Roda (2014-2018); T. Maleniuk&N. Sobko(2018); Anderson A., BabcockM. (2008)is devoted

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to the research of the influence of reproductive hormones on the functional state, adaptive reactions and manifestation of physical qualities in the system of the women sports training. It has been established that the adaptive capabilities of the female body to specific loads of female athletes, specializing in 800m and 1500m running, depend on the hormonal status during the MC. The postovulatory and postmenstrual phases of the cycle are optimal for the manifestation and development of anaerobic-aerobic endurance, which is confirmed by the high functional capabilities of the female athlete's body, as compared to the menstrual, menstrual and ovulatory phases of the MC. This fact needs to be taken into account when planning re-training loads for female athletes, specializing in medium distance running. The issue of improving the efficiency of athletes' training work in accordance with the functional state in the various phases of the MC and, accordingly, the construction of training mesocycles for women, specializing in 800 m and 1500 m running, remains inadequately studied.

The purpose of the study is to determine the effectiveness of the proposed mesocycles, built on the basis of the functional capabilities and special ability dynamics of qualified female athletes, specializing in 800 m and 1500 m running, in their training process.

Materials and methods

13 women, aged 17-24, who specialize in medium distances running, participated in this survey (3 of them are CMS, 5 – first-class, 5 – second-class). The state of all the female athletes' health was within the limits of the physiological norm. None of the female athletes took contraceptives and everyone had normal menstrual flow. In the female body, due to the maturation of the egg ovary and subsequent ovulation, the concentration of reproductive hormones changes cyclically, which makes it possible to conditionally divide the MC into phases. Daily measurements of basal axial temperature made it possible to simultaneously determine the ovulation phase with the subsequent calculation of five phases of MC. The phases of the MC are divided as follows: phase I – menstrual (1^{st}-5^{th} days of the cycle); phase II – postmenstrual (6^{th}-12^{th}days of the cycle); III phase – ovulatory (13^{th}-15^{th}days of the cycle); IV phase – postovulatory (16^{th}-26^{th} days of the cycle); V phase - premenstrual (27^{th}-28^{th} days of the cycle) (Shakhlina L.et al., 2016). The study lasted during two mesocycles.

Heart rate monitoring was performed with the help of the sport test gauge Polar S610i (Finland). Training loads were performed in the following areas: aerobic recovering (AR) – heart rate up to 140 heart beats per minute^{-1}, aerobic developing (AD) - heart rate at 140-160 heart beats per minute^{-1}, aerobic-anaerobic (A-AN) heart rate at 170-180 heart beats per minute^{-1}, anaerobic glycolytic (AN-G) heart rate max, and anaerobic creatine phosphate (AN-C) (heart rate is not informative). Lactate was determined, using the BM-Lactate test strip Lactate № 25 with the help of" Accutrend Plus" device (Switzerland).

The processing of the quantitative indices of the results of the athletes' survey was carried out by statistical processing of the received digital data on a personal computer with the help of variance, dispersion analysis (Statistica program). The average values of indexes ($\overline{X}$), standard error (m), Student's criterion (), correlation have been calculated.

Results.

In the management of the training process of athletes, specializing in medium distance running, the definition of means for developing the aerobic-anaerobic possibilities of an organism as an important component of special endurance becomes of special importance. To ensure that the physical condition of the athlete has been realized at the highest level in competitive activities, we have chosen the best means and methods of training in planning the training sessions. Depending on the chosen training method, we adhered to a defined sequence in choosing a method for increasing the stress in one mode or another and taking into account the ratio of anaerobic and aerobic energy suppliers. We have analyzed the basic means and methods, used in the training process of athletes, specializing in medium distances running, and the structure of shocked microcycles is determined.

We have planned three distinctivehigh-impactmicrocyclesin the training process of athletes, who specialize in medium distances running, where a significant and large load is used, which differs by size due to volume and intensity. The training loads in the first high-impactmicrocycle was performed mainly in the aerobic mode and amounted to 89.29%, in anaerobic – 10.71%, and the total volume of work was 39 200 m (Chart 1).

Chart1

Distinctive 1st high-impact microcycle of the training process of athletes, specializing in medium distances running

Day of microcycle	The orientation of the occupation		The basic method and the means of exercise
	Pedagogic	Physiologic	
First	Aerobic capacity improvement Speed capacity improvement	Aerobic developing Anaerobic creatine phosphate	Pace running 6 km Special exercises complex Acceleration 6×100m
Second	Improvement of technical preparation and high-speed capabilities	Anaerobic creatine phosphate	Variable running 10×100m after 100 m (speed 80–90 %)
Third	Recovery	Aerobic recovering	Cross-country running 5km, sauna
Fourth	Aerobic capacity improvement	Aerobic developing	Pace running 8 km

	Speed capacity improvement	Anaerobic creatine phosphate	Special exercises complex Acceleration 6×100m
Fifth	Aerobic capacity improvement	Anaerobic glycolytic	Repeat running 4×200m, 2×300m
Sixth	Aerobic capacity improvement Speed capacity improvement	Aerobic developing Anaerobic creatine phosphate	Pace running 10km Special exercises complex Acceleration 6×100m
Seventh	Rest		

In order to develop and improve special endurance and speed possibilities of female athletes' sports training, specializing in medium distances running, a second high-impact microcycle has been used with a load, much higher, compared with the first microcycle (Chart 2).

Chart2

Distinctive 2nd high-impact microcycle of the training process of athletes, specializing in medium distances running

Day of microcycle	The orientation of the occupation		The basic method and the means of exercise
	Pedagogic	Physiologic	
First	Aerobic capacity improvement Speed capacity improvement Improvement of technical preparation.	Aerobic developing Anaerobic creatine phosphate	Pace running 8 km Special exercises complex Acceleration 6×100m Muscle building exercises' complex
Second	Integrated (parallel development of endurance and anaerobic capabilities)	Anaerobic glycolytic	Variable running 4×200m after 200m (5 series)
Third	Recovery	Aerobic recovering	Cross-country running 5km, sauna
Fourth	Aerobic capacity improvement Speed capacity improvement	Aerobic developing Anaerobic creatine phosphate	Pace running 10km Special exercises complex Acceleration 6×100m Muscle building exercises' complex
Fifth	Increasing of special endurance	Aerobic-anaerobic	Repeat running 2×1km (2 series), the rest between the running 1 min, and between series – 2 min
Sixth	Aerobic capacity improvement Speed capacity improvement	Aerobic developing Anaerobic creatine phosphate	Even running 12km Special exercises complex Acceleration 6×100m
Seventh	Rest		

The training load was performed mainly in aerobic mode. It stated 79.92%, while the volume in anaerobic creatine phosphate mode was 11.88%, in aerobic-anaerobic – 8.20%, and the total volume of work was 48 800 m. The loads were directed at the development of special endurance and high-speed capabilities, which are very important for the training of athletes, who specialize in medium distances running.

Chart3

Distinctive 3rd high-impact microcycle of the training process of athletes, specializing in medium distances running

Day of microcycle	The orientation of the occupation		The basic method and the means of exercise
	Pedagogic	Physiologic	
First	Aerobic capacity improvement Speed capacity improvement Improvement of technical preparation.	Aerobic developing Anaerobic creatine phosphate	Pace running 10km Special exercises complex Acceleration 6×100m Muscle building exercises' complex
Second	Integrated (parallel development of endurance and anaerobic capabilities)	Anaerobic glycolytic	Repeat running 3×300m after 300m (5 series)
Third	Recovery	Aerobic recovering	Cross-country running 5km, sauna
Fourth	Aerobic capacity improvement Speed capacity improvement	Aerobic developing Anaerobic creatine phosphate	Pace running 10km Special exercises complex Acceleration 6×100m Muscle building exercises' complex
Fifth	Increasing of special endurance	Aerobic-anaerobic	Repeat running 2×1km 1×1,5 km (2 series), the rest between the running 1 min, and between series – 5 min
Sixth	Aerobic capacity improvement Speed capacity improvement	Aerobic developing Anaerobic creatine phosphate	Even running 14km Special exercises complex Acceleration 6×100m
Seventh	Rest		

In the third high-impact microcycle, the total amount of training load increased and hit 55 600 m (Chart 3), of which it was 82.55% in the aerobic mode, while in the anaerobic creatine phosphate – 3.24%, in the anaerobic-glycolytic – 1, 62% and in the aerobic-anaerobic – 12.59%.

Chart4

Distinctive recovering microcycle of the training process of athletes, specializing in medium distances running

Day of microcycle	The orientation of the occupation		The basic method and the means of exercise
	Pedagogic	Physiologic	
First	Aerobic capacity improvement Speed capacity improvement	Aerobic recovering Anaerobic creatine phosphate	Even running 10 000 m Special exercises complex Acceleration 6×100 m
Second	Integrated (parallel development of endurance and anaerobic capabilities)	Anaerobic glycolytic	Repeat running 10×100 m after 100 m (speed 80–90 %) Jumping exercises complex
Third	Recovery, sauna	Aerobic recovering	Cross-country running 5 km
Fourth	Aerobic capacity improvement Speed capacity improvement	Aerobic recovering Anaerobic creatine phosphate	Even running 8 000 m Special exercises complex Acceleration 6×100 m Muscle building exercises' complex
Fifth	Speed capacity improvement	Anaerobic glycolytic	Повторний 4×200 м
Sixth	Aerobic capacity improvement Speed capacity improvement	Aerobic recovering Anaerobic creatine phosphate	Even running 12 000 m Special exercises complex Acceleration 6×100 m
Seventh	Rest		

The data in Chart 4 shows that in restorative microcycles loads are directed to active rest, they should be applied after a series of high-impact microcircuits. The training loads were carried out mainly in aerobic regenerative mode. They amounted to 91.93%, while the volume of work in anaerobic mode was 8.07%, and the total work – 44 600 m.

The offered organization of weekly microcycles is due to the educational activities regime of female athletes. At each MC, the female athletes fit into weekly microcycles: at 21st day of the MC – into three microcycles, at 28th day of the MC – into four, at 35thday of the MC – into five, and at 42nd day of the MC – into six. Construction of the training process by weekly microcycles during the MC provides the opportunity to alternate load and rest.

However, the functional capabilities of the female body in different phases of the MC are different. Thus, it is known from the literature sources and it is confirmed by our studies that the optimal phases during exercise are postovulatory and postmenstrual phases, compared to menstrual, premenstrual and ovulatory.

Therefore, as the peculiarity of planning the training process of female athletes, specializing in medium distances running, we consider the distribution of mesocycle intomicrocycles, which coincide with the duration of the MC phases. The effect of the main load on the female athlete's body should be on a more favorable phase. This contributes to the rational use of the athlete's functionality to achieve the optimal effect of scheduled loads, provides conditions for optimal matching between the processes of fatigue and recovery.

Female athletes' basicmesocycle was built in accordance with the phases of the MC. We have determined the amount of training load of different orientations in high-impact and regenerative microcycles (Chart 5). Therefore, we have used the high-impact microcycles and the short-term restorative ones in these mesocycles. The proposed specificity of the basic mesocycles' construction was used at the second stage of the preparatory period.

During the 1st regenerative microcycle, which began on the 27th day of the MC and lasted up to the 5th day of the MC (in the premenstrual and menstrual phases of the MC), the running load was 33 km (17.15% of the total volume of the mesocycle), from which the work in the aerobic recovering zone of energy supply was 29 km (87.88%), in the anaerobic glycolytic zone – 1.8 km (5.45%) and in the creatine phosphate one – 2.2 km (6.67%) (Figure 1, Chart 5).

In a high-impact microcycle (from 6thto the 12th day of the MC), the work was performed mainly in the aerobic developing zones – 28 km (60.61%), in the aerobic recovering – 11 km (23.81%), in anaerobic – 5.4 km (11 , 69%) and in the creatine phosphate one – 1.8 km (3.89%), while the total volume was 46.2 km (24.01%).

Chart 5

Structure and substance of the basic mesocycle of female athletes' preparation, specializing in middle distances running

Microcycle type	Training loads(*kg*)				
	Aerobic-recovering zone	Aerobic-developing zone	Aerobic-anaerobic zone	Anaerobic zone	Creatine phosphate zone
1st recovering (27th – 5th days of the MC)	29	-	-	1,8	2,2
2nd high-impact (6th – 12th days of the MC)	11	28	-	5,4	1,8
3rd recovering (13th – 15th days of the MC)	15		-	-	0,6
4th high-impact (16th – 21st days of the MC)	11	36,5	5	4,5	1,8
5th high-impact (22nd – 26th days of the MC)	7	26	4	-	1,8
Total 192,4 km	73	90,5	9	11,7	8,2

From the 13th to 15th days of the MC, which fall on the ovulatory phase, we plan a short recovery microcycle with a total volume of 15.6 km (8.11%), 15km (96.15%) of which athletes ran in an aerobic recovery zone and 0.6 km (3.85%) in creatine phosphate one.

After a recovery microcycle, a high-impact microcycle was scheduled for the 16th to 21st days with a total load of 58.8 km (30.56%), of which 11 km (18.71%) is in the aerobic recovery zone, 36, 5 km (62.08%) in the aerobic developing one, 5 km (8.50%) in the aerobic-anaerobic zone, 4.5 km (7.65%) in anaerobic, and 1.8 km (3,06%) in creatine phosphate one.

In the following high-impact microcycle (from 22nd to 26thdays of the MC), the running load was 38.8 km (20.17%), the training work was mostly carried out in the aerobic developing zone – 26 km (67.01%), in the aerobic regenerative one – 7 km (18.04%), in aerobic-anaerobic – 4 km (10.31%), and in thecreatine phosphate one – 1.8 km (4.64%).

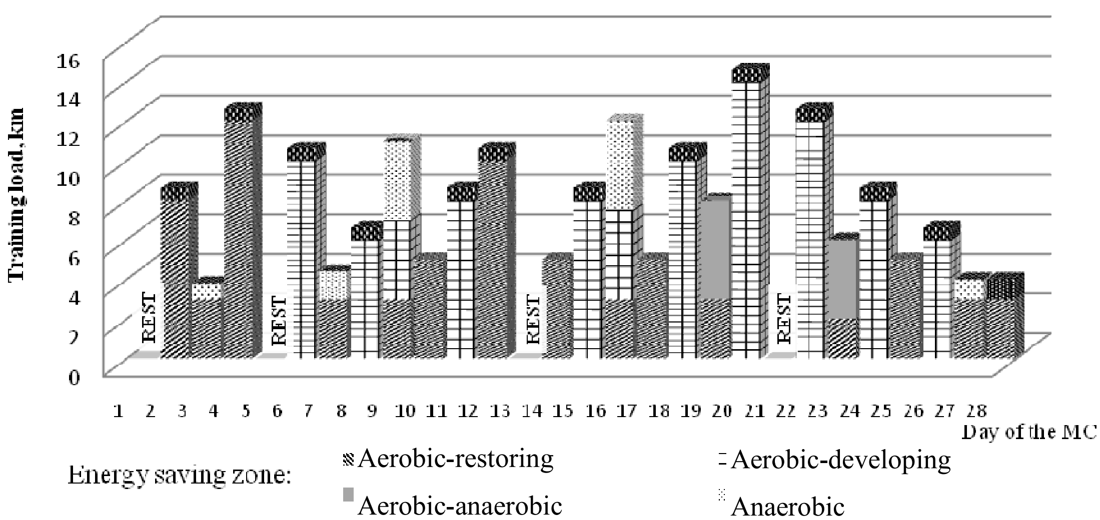

Figure 1.Basic mesocycle of the training process for women, specializing in medium distances running, construction.

To assess the level of efficiency in a pre-racemicrocycle, we have offered a test – 400 m running with the adversary speed, which is often used by athletes, specializing in medium distances running, with simultaneous monitoring of the heart rate and blood lactate level determination. A significant increase in results among the CMS and 1st class female athletes at a distance of 400 m - 67,37 ± 5,55 s ($p < 0.01$ - significant changes in results as compared with the second discharge) has been monitored, comparing to the best results during the postovulatory phase of the MC (70,53 ± 5.06 s), while the max. heart rate indexes – 177.25 ± 3.73 beats/min^{-1}; average heart rate – 167.00 ± 4.24 beats/min^{-1} and lactate – 8.31 ± 2.12 moles/l^{-1} decreased in relation to these parameters in the postovulatory phase (178.75 ± 4.23 beats/min^{-1}, 168.37 ± 4.81 beats/min^{-1}, 10.0 ± 3.53 mmoles/l^{-1}) respectively (Chart 6).

Chart 6

Working capacity and adaptive reactions of women, specializing in medium distances running in pre-race microcycle

Index	CMS / 1st class athletes		2nd class athletes	
	4th phase of the MC	Pre-race microcycle	4th phase of the MC	Pre-race microcycle
400 m running result	70,53±5,06	67,37±5,55*	83,12±10,19	75,42±9,90
Maximum heart rate	178,75±4,23	177,25±3,73	180,20±5,76	179,80±5,40
Average heart rate	168,37±4,81	167,00±4,24	171,80±3,96	171,20±3,83
Lactate	10,0±3,53	8,31±2,12	10,40±2,46	9,08±2,19

Note. * – ($p<0,01$) – exact results' change, comparing to the 2nd class.

Similarly, the 2nd class female athletes' result improved – 75,42 ± 9,90 sec, comparing to the postovulatory phase of the MC – 83,12 ± 10,19 sec, while the max .heart rate indexes – 179,80 ± 5,40 beats/min^{-1}, the average heart rate – 171,20 ± 3,83 beats/min^{-1}andthe lactate – 9,08 ± 2,19 moles/l^{-1} decreased, compared to the postovulatory phase (180,20 ± 5,76 beats/min^{-1}, 171,80 ± 3.96 beats/min^{-1}, 10.40 ± 2.46 moles/l^{-1}) respectively.

The implementation of the proposed basic mesocycles, the construction of which corresponded to the functional capabilities of the MC, in the training process of athletes improved the outcome of the competition. To determine its effectiveness, we compared the best results of 2017 with the figures of the 2018 competition.

Hence, better results of the CMS and 1st class athletes in 2013 at a distance of 800 meters were 135,77 ± 4,61 sec, at 1500 m – 281,55 ± 7,52 sec, which is higher ($p <0.01$), comparing to the 2nd class athletes, where the result at 800 m was 155.12 ± 13.88 sec, at 1500 m – 320.16 ± 13.35 sec (Chart 7).

In May 2018, CMS and 1st class female athletes overcame the distance of 800 m with the result of 134.27 ± 5.36 sec, and 1500 m – 278.52 ± 5.36 sec. This result is significantly higher ($p <0,01$) than of the 2nd class female athletes (800 m – 152,12 ± 12,18 sec, and 1500 m – 315,44 ± 8,31 sec). In June 2018, the results of CMS and 1st class female athletes were: at 800 meters – 132,64 ± 4,87 sec ($p <0.01$) and at 1500 m – 275,92 ± 5,82 sec ($p <0.01$), which is probably higher, compared to the results of the 2nd class ones (800 m – 150,22 ± 11,52 sec, 1500 m – 310,60 ± 3,07 sec).

Chart 7

Female athletes running results' dynamics at 800m and 1500m

Index	CMS / 1st class	2nd class
800 m running result (2017)	135,77±4,61*	155,12±13,88
1500 m running result (2017)	281,55±7,52*	320,16±13,35
800 m running result (May, 2018)	134,27±5,36*	152,12±12,18
1500 m running result (May, 2018)	278,52±5,36*	315,44±8,31
800 m running result (June, 2018)	132,64±4,87*	150,22±11,52
1500 m running result (June, 2018)	275,92±5,82*	310,60±3,07

Note. * – ($p<0,01$) – exact results' change, comparing to the 2nd class.

The CMS and 1st class female athletes have a 400 m runoff with a high degree of interconnection with the competition figures of 800 m (r_s = 0.80) and a marked degree of interconnection with 1500 m (r_s = 0.62). The 2nd class female athletes have a high degree of interconnection with the results of the competition at 800 m (r_s = 0.80), 1500 m (r_s = 0.90), which serves to use running at 400 m as a control tool for predicting female athletes' performances in competitions (Roda O., 2014; Romanenko V.etal., 2018).

Discussion.

The modern system of sports training is based on the specific principles, the main of which is the continuity of the training process, the unity of the gradual load increase and the tendency towards the maximum loads, the waviness and flexibility of loads, the cyclic nature of the training process, etc. This approach creates optimal conditions for the female athletes to carry out large volumes of training load, effective recovery after them and for the course of adaptive processes, prevention of overwork and over-training.

In the female athletes' training system the mesocycle can last for 3-6 weeks and represents a relatively holistic stage of the training process. There are engaging, basic, control, preparatory, pre-race, and racing mesocycles. The program of basic mesocycles provides for the main work, aimed at increasing aerobic-anaerobic capacity, development of physical qualities, the formation of technical, tactical and mental training. The training program includes a variety of tools with a large volume and intensity of work, extensive use of occupations with high loads(PlatonovV., 2015).

One of the most important structural units of the training process aremicrocycles – the basis for building the mesocycles. According to the data, presented in the individual plans of female athletes, specializing in medium distances running and taken from interviewing the trainers, it has been established that the basicmesocycle is usually used in the following structure: three high-impact and one recovery microcycles. It is known that the main task of this mesocycle is to increase overall physical training and improve the functional capabilities of the female athlete's body. A number of researchershave identified an approach, aimed at improving aerobic and anaerobic energy supply mechanisms through a variety of physical training regimes (WilmoreJ. &Costill D., 1994).

Means of sports training are physical exercises, which are conditionally divided into general preparatory, auxiliary, specially prepared and competitive. In the process of sports training exercises are performed in the framework of two basic methods – continuous and interval – they may be performed both in uniform and in alternating modes.

As one may know, the loads, used in training, are divided into the following regimens: aerobic restoring, aerobic developing, aerobic-anaerobic, anaerobic glycolytic, anaerobic creatine phosphate. For the middle-distance runners, we often used a load with aerobic developing and especially anaerobic glycolytic mechanisms of energy supply.

In the sport training of athletes, we used the menstrual cycle as a natural biological model for analyzing physical performance and the nature of adaptive processes, taking into account the hormonal status of the female body, which changes during the MC (ShakhlinaL. etal., 2016).

It has been established that the optimal phases for the manifestation and development of aerobic possibilities are postovulatory and postmenstrual phases of the cycle. In the postmenstrual and postvulatory phases of the MC, the functional state of the cardiovascular system (CVS) of female athletes has improved significantly. The functional value of the work performed, which we judged by the average and the maximum heart rate, declined, which indicates the effectiveness of the CVS work. The level of lactate in the blood is the lowest, which indicates its high utilization during the work; a smaller increase in glucose states about the efficiency of energy supply. Significant growth of hemoglobin in the postovulatory phase improves the delivery of oxygen to working muscles, thereby accelerating the recovery of heart rate and lowering the level of lactate in the blood during the recovery. In these phases of the MC, we have offered high-impactmicrocycles with significant and large loads (ShakhlinaL. etal., 2016; RodaO. etal., 2017).

In the ovulatory phase, a slight decrease has been noticed in the functional state of the CVS, it was reflected in the female athletes' performance, which slightly decreased, compared with the postmenstrual and postovulatory phases of the MC. A slight increase in heart rate and lactate level and glucose concentration in blood during the distances running have been determined, comparing to the postmenstrual and postovulatory phases of the MC. Lowering the hemoglobin content leads to the predominance of anaerobic sources of provision of prescribed training, reduces the rate of recovery of heart rate and the utilization of lactate. In this phase, we have been offered a short three-day regenerative microcycle to ensure the process of ovulation (Kalytka S.etal., 2018).

In the premenstrual and menstrual phases of the MC, a significant decline in the functional state of the CVS is reflected in the reduction of working capacity. Significant growth of maximal heart rate indicates a high functional value of the work, performed. High levels of lactate and glucose in blood indicate the strain of metabolic processes in the body. The reduction of erythrocytes and hemoglobin in the menstrual phase leads to a decrease in the oxygen delivery to the muscles and the inclusion of anaerobic energy supply, while reducing the rate of the heart rate recovery and the utilization of lactate. In these phases of the MC, we used recovering microcycles with a low load.

Analyzing the data presented, we note the close relationship between the working capacity and the adaptation of physiological functions to physical activity in different phases of the MC, which, of course, is an important factor in the planning of the female athletes' training process (Maleniuk T. &Sobko N. 2018; KalytkaS., etal., 2015).

In the training process, the structure of competitive mesocycles is determined by the degree of preparedness, the characteristics of the sports calendar and the qualifications of athletes. Normally, responsible competitions cover a period from two to three months and usually run from two to four competitive mesocycles. The pre-racemesocycle is used at the end of the preparatory period. During these mesocycles, there is a further decrease in the total amount of training load and the increase in the amount of work in a mixed mode. At a punctual MC, one can calculate at which stage of the cycle the female athlete will perform in the competition, and individually make a correction to the structure of this mesocycle. Subjected to the competition microcycle is planned in the postmenstrual and postovulatory phases of the cycle with the average load, and in the premenstrual, menstrual and ovulatory – with small loads.

Conclusions.

Thus, the mesocycle in the sports training of female athletes, specializing in middle distances running, is identified with the menstrual cycle as a natural biological model, which is due to the hormonal status of their organisms, which affects the physical fitness of female athletes. Changes in the functional state that occur during the MC of the female athletes, give us the opportunity to divide the cycle into the phases, which can be physiologically substantiated by specific microcycles, have a certain duration and functional characteristic at normal MF. For that matter, we make a redistribution of the load: during the periods of physiological stress, we reduce the load, using restorative microcycles in the training process, and during the periods of high efficiency – high-impact ones. In the postmenstrual and postovulatory phases of the MC, we plan high-impact, and in the premenstrual, menstrual and ovulatory phases – restoringmicrocycles. The redistribution of training loads by volume and intensity, taking into account the functional capabilities of the female athletes' bodies in different phases of the MC, will enable the trainer to fulfill his or her planned 100% load, while maintaining the health of athletes, and thus creating the conditions for achieving high sports results, keeping their sports longevity.

Application of offered by us basicmesocycles, taking into account changes in the functional state of their body during the MC, in the female athletes' training process, specializing in medium distances running, has made it possible to significantly improve their outcome in competitions.

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