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Formation of a specific biological cycle in young skiers-racers and biathletes 11–15 years, depending on the level and direction of physical activity

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The article presents the results of the analysis of the ratio of the training process according to the types of training and the performed cyclic physical activity and their influence on the formation of a specific biological cycle in female skiers-racers and biathletes 11–15 years old at the initial training stage and preliminary basic training.

Purpose: *to analyze the cyclic physical activity performed during the annual macrocycle in the period of the formation of a specific biological cycle of female skiers-racers and biathletes for 11, 12, 13, 14 and 15 years.*

Material & Methods: *analysis of literary sources and planning documents, self-control diaries; survey and questioning; methods of mathematical statistics. In total, 88 young athletes of different ages took part in the study. The respondents included: skiers-racers 11–15 years old, biathletes 11–15 years old, trainers.*

Results: *features of the formation of menstrual function in female skiers-racers and biathletes 11–15 years of age under the influence of a specific load were determined.*

Conclusions: *out of 42 female skiers-racers aged 11–15 years, 53% had no menstruation, 29% had menarche or 1–2 menstruation, 12% had irregular menstruations and 5% had regular menstruations, and also from 46 female athletes 55% have no menstruation, 23% have menarche or 1–2 menstruation, 19% have irregular menstruation, and only 3% have regular menstruation.*

Keywords: *skiers-racers and biathletes 11–15 years old, menstrual function, cyclic exercise, intensity zones.*

Introduction

The modern development of cross-country skiing and biathlon is characterized by an increase in speed-strength endurance while traveling a distance, which makes it necessary to search for reserves to improve competitive performance, especially for women. In addition, these ski sports are associated with significant physical and psycho-emotional loads that exceed the adaptive capacity of the body of young female athletes [3; 5].

At the same time, the planning of sports training in most cases is carried out without taking into account the peculiarities of the female body and the current readiness of the systems of the body of young athletes to perceive a particular physical activity [6; 8].

In the works of V. V. Mulyk, S. K. Fomin, V. I. Pivovarov [3; 4] it was proved that the use of specific physical loads without taking into account the features of a female organism negatively affects the functional state and sports result in skiing and biathlon.

According to scientists (Yu. T. Pokholenchuk, N. V. Svechnikova, L. Ya.-G. Shakhlin), the processes of the sexual development of the girl proceeds in the pre- and puberty periods, during which time sexual reproduction undergoes transformation in the organism, as a result which girl becomes a woman [2; 6].

Particular importance is given to the effect of specific loads on the development of all functions and systems of the growing organism, especially in skiing and biathlon. At the same time it is impossible without a scientific approach to organizing the training process of young athletes and without taking into account individual anatomical and physiological features in the future to achieve high sports results [3; 7]. This position is of particular importance in the training process of young athletes, since training loads, especially in cyclic sports, are very significant [5].

In connection with this, the study of the formation and progress of the ovarian-menstrual cycle (OMC) in young athletes specializing in skiing and biathlon will allow deeper consideration of this problem, and the results of the study should be recommended to trainers when constructing the training process.

Purpose of the study: to analyze the cyclic physical activity performed during the annual macrocycle in the period of the formation of a specific biological cycle of female skiers-racers and biathletes for 11, 12, 13, 14 and 15 years.

The implementation of this goal envisaged the following

tasks: to analyze the training loads during the one-year macrocycle of female skiers-racers and biathletes for 11–15 years to determine the effect of physical activity on the formation of a specific biological cycle of female skiers-racers and biathletes for 11–15 years.

Material and Methods of the research

An analysis of literary sources and planning documents, analysis of diaries, surveys, questionnaires; methods of mathematical statistics. The research was conducted during the summer training process. The volume and intensity of different training tools were analyzed, which were divided in size (small, medium, substantial, large) and direction (high-speed, anaerobic, aerobic) of young athletes of the Kharkiv Regional High School of Physical Culture, Children and Youth Sports School Kharkiv and Kharkiv region. In total, 88 young athletes of different ages participated in the research. The composition of respondents included: female skiers-racers 11–15 years old, biathletes 11–15 years old, coaches.

Results of the research

Preparing a young female athlete is a multifaceted process, and all of his parties are interconnected, the proportion of each of them changes at different stages of the training process. With the development of preparedness and improvement of sports results, the role of taking into account the biological characteristics of adolescence increases [7; 8].

A number of specialists [1; 3] in the field of gynecology and physiology believe that in adolescence, a link between the level of work capacity and endurance with the function of the ovaries is traced. The later, the girl appears menstruation, the more often there are high levels of fatigue at lower stresses.

The research was conducted during the summer training process, where the volume and intensity of various training tools was analyzed, the plans of training young athletes of 11–15 years with the chosen sport (skiing, biathlon).

The means of *general physical training* include: physical exercises in gymnastics, athletics, sports and outdoor games, cross-country running, cycling and other exercises in different quantities depending on age.

Special physical training consisted of exercises, according to the structure of efforts at the time of execution corresponded to movements that are inherent in skiing (work on simulators, imitation with ski poles alternately and at the same time, movement on a ski-roller with simultaneous steps and others).

Technical and tactical training involved the use of training tools that involve the use of elements of ski equipment in various competitive situations (overcoming ascents, descents, turns, braking both on skis and on roller skis). Participation in the competition was carried out in accordance with the calendar of competitions.

It was determined that physical, technical and tactical training and participation in competitions were distributed as follows: in female skiers-racers for 11 years, general physical training – 59%, special – 19%, technical and tactical – 18%, participation in competitions – 4%; in 12 years, general physical training – 45%, special – 34%, technical and tactical – 12%, participation in competitions – 9%; at the age of 13: general physical training – 40%, special – 41%, technical and tactical - 10%, participation in competitions – 9%; at the age of 14, general physical training – 31%, special – 48%, technical-tactical – 10%, participation in competitions – 11%; at 15 years old: general physical training – 22%, special – 54%, technical-tactical – 10%, participation in competitions – 14% (Figure 1).

Regarding ski racing, the training process in biathlon consists of ski (racing) and rifle training. Rifle training involves the use of pneumatic and then rifled firearms, therefore, at the initial stage, safety precautions are taken when shooting in the shooting range and at the shooting range; the shooting technique is mastered and improved at rest and during physical exertion from a prone position, with an emphasis on the firing technique from a prone position from a belt and from an air (or other lightweight) rifle; studied the material part of small-caliber rifles BI-6; BI-7.

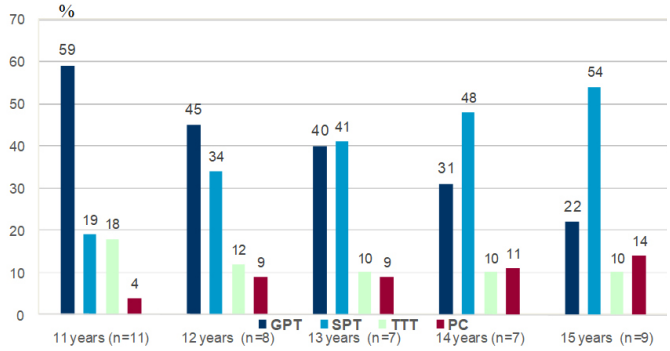

Fig. 1. Analysis of the ratio of the training process by type of training in female skiers-racers 11, 12, 13, 14 and 15 years (%): *GPT – general physical training; SPT – special physical training; TTT – technical and tactical training; PC – participation in competitions*

The analysis of general and special training, technical and tactical training, shooting and comprehensive training in young female biathletes 11–15 years, where the female biathletes 11 years determined the following ratio: total – 58%, special – 14%, technical and tactical – 10% rifle 11%, complex – 1%, participation in competitions 4% (Figure 2). In biathlon women of 12 and 13 years old, general physical training is 44% and 39%, special physical training – 20% and 24%, technical and tactical training – 12% and 10%, rifle training – 14% and 14%, complex training – 3 % and 4%, participation in competitions – 7% and 9% (Figure 2).

In female biathletes of 14 and 15 years, general physical training was 28% and 23%, special physical training – 28% and 32%, technical and tactical training 12% and 10%, rifle training 16% and 14%, comprehensive training 5% and 9 %, par-

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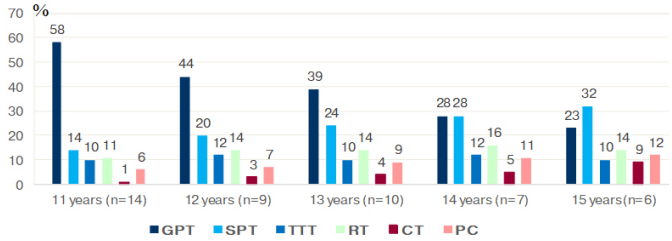

Fig. 2. Analysis of the ratio of the training process by type of training in female biathletes 11, 12, 13, 14 and 15 years (%): *GPT – general physical training; SPT – special physical training; TTT – technical and tactical training; RT – rifle training; CT – complex training; PC – participation in competitions*

ticipation in competitions 11% and 12% (Figure 2).

The analysis of the cyclic physical exercise performed in skiers-racers 11–15 years old is given in Table 1, and suggests that the indicators of the volume of cyclic exercise in 12-year-old skiers-racers relative to skiers-racers 11 years increased by 447,5 km (t=5,81; p<0,001); at the age of 13 relative to 12 years at 618,1 km (t=14,49; p<0,001); at the age of 14 relative to 13 years at 566,7 km (t=8,75; p<0,001); at the age of 15 relative to 14 years at 349,6 km (t=3,32; p<0,001) (Table 1).

The volume of cyclic physical activity from skiing and skiing training, running and imitation in female skiers-racers for 12 years is 297,7 km (t=6,03; p<0,001) more relative to the data of female skiers-racers for 11 years, in 13 years – by 252,7 km (t=4,25; p<0,01) relative to 12 years, 14 years 157,2 km (t=7,56; p<0,001) relative to 13 years; 15 years 157,2 km (t=2,22; p<0,05) relative to 14 years (Table 1).

The amount of ski-training preparation increased annually from 365,6 km to 484,8 km (t=2,48; p<0,05) at 12 years, from 484,8 km to 513,0 km (t=0,50; p<0,05) at 13 years old, from 513,0 km to 702,1 km (t=2,24; p<0,05) at 14 years, from 702,1 km to 903,6 km (t=2,59; p<0,05) at 15 years (Table 1).

Also, the volume of running and imitation statistically changed in skiers-racers of 12 years relative to indicators of skiers-racers of 11 years and in indicators of skiers-racers of 13 years relative to indicators of skiers-racers of 12 years (p<0,01–0,001).

Significant loads were performed with different intensity (Table 1). So, 11 years old female athletes 64,4% of the work was carried out at a heart rate (HR) of up to 140 beats·min^{-1}, 27,0% – at 140-160 beats·min^{-1}, 6,4% – at 160–180 beats·min^{-1}, 2,2% – 180 beats·min^{-1} and above; in 12 years: 45,2%, 33,4%, 17,3%, 2,2%, respectively; at 13 years: 38,9%, 31,2%, 21,2%, 8,7%, respectively; at 14 years: 34,7%, 26,2%, 24,8%, 14,3%, respectively; at 15 years: 38,5%, 20,4%, 26,2%, 14,9% respectively.

Table 1

Analysis of the cyclic physical load performed by female skiers-racers 11–15 years for a one-year macrocycle

Cyclic physical load	Skiing					Evaluation of statistical difference	
	11 years (n=11) $\bar{X}_1 \pm m_1$	12 years (n=8) $\bar{X}_2 \pm m_2$	13 years (n=7) $\bar{X}_3 \pm m_3$	14 years (n=7) $\bar{X}_4 \pm m_4$	15 years (n=9) $\bar{X}_5 \pm m_5$	t	p
Total amount of cyclic load, km	1868,1±65,88	2315,6±39,80	2933,7±15,31	3500,4±62,93	3850,0±84,32	$t_{1,2}$=5,81; $t_{2,3}$=14,49; $t_{3,4}$=8,75; $t_{4,5}$=3,32	$p_{1,2}$<0,001; $p_{2,3}$<0,001; $p_{3,4}$<0,001; $p_{4,5}$<0,01
Total amount of ski training, km	557,1±19,56	854,8±45,30	1107,5±38,50	1458,2±25,91	1615,4±65,82	$t_{1,2}$=6,03; $t_{2,3}$=4,25; $t_{3,4}$=7,56; $t_{4,5}$=2,22	$p_{1,2}$<0,001; $p_{2,3}$<0,001; $p_{3,4}$<0,01; $p_{4,5}$<0,05
Total amount of ski-roller training, km	365,6±41,38	484,8±24,64	513,0±51,21	702,1±67,33	903,6±38,90	$t_{1,2}$=2,48; $t_{2,3}$=0,50; $t_{3,4}$=2,24; $t_{4,5}$=2,59	$p_{1,2}$<0,05; $p_{2,}$>0,05; $p_{3,4}$<0,05; $p_{4,5}$<0,05
The total amount of running, imitation, km	826,2±43,80	1095,2±41,40	1313,2±37,60	1305,4±21,8	1331,0±31,70	$t_{1,2}$=4,46; $t_{2,3}$=3,90; $t_{3,4}$=0,18; $t_{4,5}$=0,67	$p_{1,2}$<0,001; $p_{2,3}$<0,01; $p_{3,4}$>0,05; $p_{4,5}$>0,05
Heart rate, beats min^{-1},%:							
up to 140	64,4±16,57	45,2±11,98	38,9±22,56	34,7±15,50	38,5±15,70	$t_{1,2}$=0,94; $t_{2,3}$=0,25; $t_{3,4}$=0,15; $t_{4,5}$=0,17	$p_{1,2}$>0,05; $p_{2,3}$>0,05; $p_{3,4}$>0,05; $p_{4,5}$>0,05
140-160	27,0±1,67	33,4±2,21	31,2±6,56	26,2±1,67	20,4±1,09	$t_{1,2}$=2,31; $t_{2,3}$=0,21; $t_{3,4}$=0,59; $t_{4,5}$=2,91	$p_{1,2}$<0,05; $p_{2,3}$>0,05; $p_{3,4}$>0,05; $p_{4,5}$<0,05
160-180	6,4±3,56	17,3±2,67	21,2±1,56	24,8±0,35	26,2±1,67	$t_{1,2}$=2,45; $t_{2,3}$=1,26; $t_{3,4}$=2,25; $t_{4,5}$=0,82	$p_{1,2}$<0,05; $p_{2,3}$>0,05; $p_{3,4}$<0,05; $p_{4,5}$>0,05
180 and above	2,2±0,23	4,1±0,48	8,7±2,34	14,3±0,76	14,9±0,45	$t_{1,2}$=3,57; $t_{2,3}$=1,93; $t_{3,4}$=2,28; $t_{4,5}$=0,68	$p_{1,2}$<0,01; $p_{2,3}$>0,05; $p_{3,4}$<0,05; $p_{4,5}$>0,05
Amount of load of various intensity, km:							
up to 140	1203,5±14,56	1046,9±41,80	1141,2±23,80	1182,2±25,41	1534,1±19,58	$t_{1,2}$=3,54; $t_{2,3}$=1,96; $t_{3,4}$=1,18; $t_{4,5}$=10,97	$p_{1,2}$<0,01; $p_{2,3}$>0,05; $p_{3,4}$>0,05; $p_{4,5}$<0,001
140–160	504,1±36,33	773,5±27,46	915,3±27,52	994,7±21,71	810,1±14,98	$t_{1,2}$=5,92; $t_{2,3}$=3,65; $t_{3,4}$=2,27; $t_{4,5}$=7,00	$p_{1,2}$<0,001; $p_{2,3}$<0,001; $p_{3,4}$<0,05; $p_{4,5}$<0,001
160–180	119,4±33,71	400,6±16,70	622,0±27,32	842,4±28,36	965,5±20,71	$t_{1,2}$=16,75; $t_{2,3}$=6,91; $t_{3,4}$=5,60; $t_{4,5}$=3,51	$p_{1,2}$<0,001; $p_{2,3}$<0,001; $p_{3,4}$<0,001; $p_{4,5}$<0,01
180 and above	41,1±1,67	94,6±12,58	255,2±27,52	481,1±11,60	540,3±21,56	$t_{1,2}$=4,22; $t_{2,3}$=7,56; $t_{3,4}$=10,07; $t_{4,5}$=2,42	$p_{1,2}$<0,001; $p_{2,3}$<0,05; $p_{3,4}$<0,001; $p_{4,5}$<0,05

The data of the performed volume of cyclic physical load in kilometers by intensity zones (Table 1) were also analyzed, where the statistical difference was obtained in the pulse zone up to 140 beats min^{-1} between races of female skiers 11 and 12 years old (t=3,54; p<0,01), 14 and 15 years old (t=10,97; p<0,001); in the pulse zone – 140-160 beats min^{-1} between 11 and 12 years old female skier races (t=5,92; p<0,01),

12 and 13 years (t=3,65; p<0,01), 13 and 14 years (t=2,27; p<0,05), 14 and 15 years (t=7,00; p<0,001) in the pulse zone 160-180 beats min^{-1} between indicators of female skiers 11 and 12 years old (t=16,75; p<0,001), 12 and 13 years old (t=6,91; p<0,001), 13 and 14 years old (t=5,60; p<0,001), 14 and 15 years (t=3,51; p<0,01); in the pulse zone 160-180 beats min^{-1} between the indicators of female skiers 11 and 12 years old (t=4,22; p<0,01), 12 and 13 years old (t=7,56; p<0,001), 13 and 14 years old (t=10,07; p<0,001), 14 and 15 years (t=2,42; p<0,01) (Table 1).

Table 2 presents the data of cyclic physical activity and physical preparedness of female biathletes 11–15 years old, where, when analyzing self-control diaries during the one-year macrocycle, the highest statistical difference was determined in terms of the total cyclic load in the age range of female biathletes 12–13 years old (t=6,92; p<0,001), 13–14 years (t=5,19; p<0,001), 14–15 years (t=4,47; p<0,01), and 11–12 years (t=2,84; p<0,05) (Table 2).

The highest difference was obtained due to a change in the volume of ski and ski-roller training in biathletes in the age range of 13–14 years (t=5,99; t=5,35; p<0,001), while in terms of cross-country running and no imitation changes were detected (p>0,05) (Table 2).

The functioning of the cardiovascular system of female biathletes of 11, 12, 13, 14 and 15 years in various intensity zones during the growth period is very important because it reflects the work of the cardiovascular system of the athletes.

The load in the first zone (up to 140 beats min^{-1}) at 11, 12, 13, 14, 15 years was: 65,3%, 43,3%, 28,9%, 36,3%, 32,2%, respectively; in the second (140-160 beats min^{-1}) – 25,6%, 31,8%, 36,2%, 25,8%, 28,5%; in the third (160–180 beats min^{-1}) 7,4%, 18,7%, 23,2%, 20,1%, 23,7%; in the fourth (180 beats min^{-1} and above) 1,7%, 6,2%, 11,7%, 17,8%, 15,6%, respectively (Table 2).

In biathletes 11–15 years old, the intensity of the cyclic load of the indicated age groups in all pulse zones was significantly higher than the next age (p<0,05–0,001), but in the third zone (160–180 beats min^{-1}) at the age of 13 14 and 14–15 years of statistical difference is not defined (p>0,05) (Table 2).

In the age period of 11–15 years, the formation of a specific biological cycle of girls takes place. Our survey and interviews of young skiers-racers 11–15 years of age on the formation of a specific biological cycle as a result of physical activity used determined that regular periods of 2 athletes are 14 and 15

Table 2

Analysis of the cyclic physical load performed by female biathletes 11–15 years for a one-year macrocycle

Cyclic physical load	Skiing					Evaluation of statistical difference	
	11 years (n=14)	12 years (n=9)	13 years (n=10)	14 years (n=7)	15 years (n=6)		
	$\bar{X}_1 \pm m_1$	$\bar{X}_2 \pm m_2$	$\bar{X}_3 \pm m_3$	$\bar{X}_4 \pm m_4$	$\bar{X}_5 \pm m_5$	t	p
Total amount of cyclic load, km	2352,4±87,21	2652,6±59,70	3105,2±26,78	3650,5±101,52	4211,3±73,53	$t_{1,2}$=2,84; $t_{2,3}$=6,92; $t_{3,4}$=5,19; $t_{4,5}$=4,47	$p_{1,2}$<0,05; $p_{2,3}$<0,001; $p_{3,4}$<0,001; $p_{4,5}$<0,001
Total amount of ski training, km	673,7±34,50	850,5±46,78	1006,5±45,30	1383,5±43,62	1450,2±61,45	$t_{1,2}$=3,04; $t_{2,3}$=2,40; $t_{3,4}$=5,99; $t_{4,5}$=0,89	$p_{1,2}$<0,01; $p_{2,3}$<0,001; $p_{3,4}$<0,001$p_{4,5}$>0,05
Total amount of ski-roller training, km	150,7±27,48	303,4±32,71	500,4±41,32	802,6±38,53	1204,0±78,88	$t_{1,2}$=3,57; $t_{2,3}$=3,74; $t_{3,4}$=5,35; $t_{4,5}$=4,57	$p_{1,2}$<0,01; $p_{2,3}$<0,01; $p_{3,4}$<0,001; $p_{4,5}$<0,001
The total amount of running, imitation, km	1528,0±51,6	1498,7±34,78	1598,3±82,20	1464,4±80,87	1557,1±94,31	$t_{1,2}$=0,47; $t_{2,3}$=1,12; $t_{3,4}$=0,20; $t_{4,5}$=0,20	$p_{1,2}$>0,05; $p_{2,3}$>0,05; $p_{3,4}$>0,05; $p_{4,5}$>0,05
Heart rate, beats min^{-1},%:							
up to 140	65,3±6,38	43,3±3,67	28,9±4,79	36,3±7,47	32,2±7,61	$t_{1,2}$=2,99; $t_{2,3}$=2,39; $t_{3,4}$=0,83; $t_{4,5}$=0,38	$p_{1,2}$<0,05; $p_{2,3}$<0,05; $p_{3,4}$>0,05; $p_{4,5}$>0,05
140–160	25,6±1,38	31,8±3,37	36,2±1,15	25,8±0,58	28,5±1,13	$t_{1,2}$=2,48; $t_{2,3}$=1,84; $t_{3,4}$=8,07; $t_{4,5}$=1,67	$p_{1,2}$<0,05; $p_{2,3}$>0,05 $p_{3,4}$<0,001; $p_{4,5}$>0,05
160–180	7,4±0,48	18,7±1,14	23,2±0,37	20,1±0,61	23,7±0,92	$t_{1,2}$=9,14; $t_{2,3}$=3,75; $t_{3,4}$=4,35; $t_{4,5}$=3,26	$p_{1,2}$<0,001; $p_{2,3}$<0,01; $p_{3,4}$<0,01; $p_{4,5}$<0,01
180 and above	1,7±0,04	6,2±0,31	11,7±0,37	17,8±0,12	15,6±0,26	$t_{1,2}$=14,40; $t_{2,3}$=11,39; $t_{3,4}$=15,68; $t_{4,5}$=7,68	$p_{1,2}$<0,001; $p_{2,3}$<0,01; $p_{3,4}$<0,001; $p_{4,5}$<0,001
Amount of load of various intensity, km:							
up to 140	1536,1±34,61	1140,5±28,67	897,5±51,34	1319,2±41,22	1603,6±47,38	$t_{1,2}$=8,80; $t_{2,3}$=4,13; $t_{3,4}$=6,40; $t_{4,5}$=4,53	$p_{1,2}$<0,001; $p_{2,3}$<0,01; $p_{3,4}$<0,001; $p_{4,5}$<0,001
140–160	602,8±77,56	852,5±28,61	1128,3±52,75	946,7±38,18	1203,2±72,28	$t_{1,2}$=3,02; $t_{2,3}$=4,60; $t_{3,4}$=2,79; $t_{4,5}$=3,14	$p_{1,2}$<0,01; $p_{2,3}$<0,01; $p_{3,4}$<0,05; $p_{4,5}$<0,01
160–180	175,6±33,56	499,9±38,71	715,2±61,28	738,5±44,51	729,3±28,92	$t_{1,2}$=6,33; $t_{2,3}$=2,97; $t_{3,4}$=0,31; $t_{4,5}$=0,17	$p_{1,2}$<0,01; $p_{2,3}$<0,01; $p_{3,4}$>0,05; $p_{4,5}$>0,05
180 and above	37,9±11,47	159,7±19,34	364,2±21,51	645,5±6,78	675,2±8,91	$t_{1,2}$=5,42; $t_{2,3}$=7,07; $t_{3,4}$=12,47; $t_{4,5}$=2,65	$p_{1,2}$<0,001; $p_{2,3}$<0,001; $p_{3,4}$<0,01; $p_{4,5}$<0,05

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years old, irregular periods of 5 athletes 13, 14 and 15 years and 1–2 menstruation (menarche) in 12 athletes of all age groups (Figure 1).

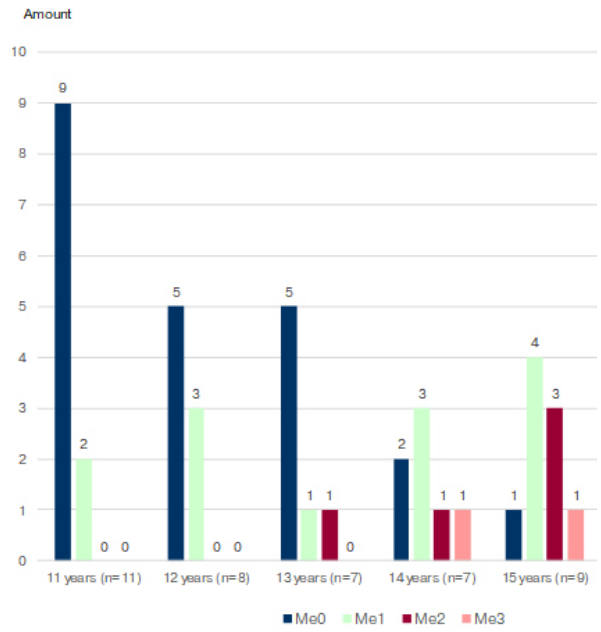

Fig. 1. Analysis of the formation of a specific biological cycle in female skiers-racers 1115 years

The data obtained from female biathletes showed that regular menstruation in 1 athlete 15 years (of 6 female athletes) irregular menstruation in the first 13 years (of 10 female athletes), in 3 14 years (of 7 female athletes) and in 4 15 years 1–2 menstruation and menarche onset in 3 11 years (of 14 female athletes), in 3 12 years (of 9 female athletes), in 2 13 years, in 2 14 years and in the first 15 years the absence of a specific cycle in the 11th 11 years (of 14 female athletes), in the 6th – 12 years, in the 7th 13 years, in the 1st 14 years (Figure 2).

Conclusions / Discussion

More and younger athletes appear on the international arena that successfully compete with recognized masters, but a large percentage of young skiers and biathletes who were promising at a young age do not achieve high athletic results, one of the reasons is high loads, including the period of formation of a specific biological cycle. The above mentioned study of the characteristics of the onset and formation of a specific biological cycle and the expediency of using various physical exercises in size and direction with the use of separate means of ski-racing training.

It is established that the development of motor skills, as well as the increase in athletic performance in adolescents depends

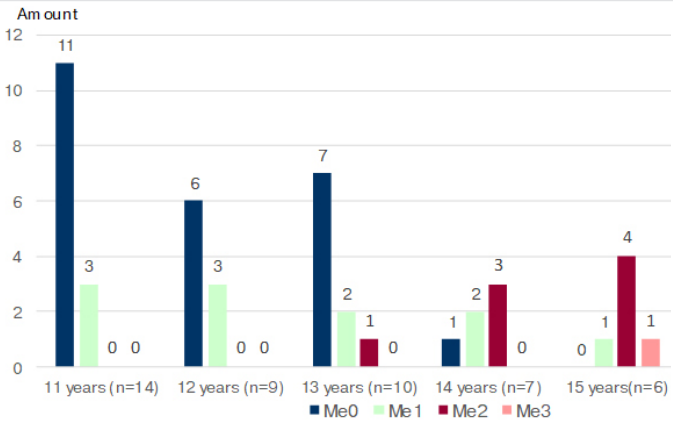

Fig. 2. Analysis of the formation of a specific biological cycle in female biathletes 11–15 years

on the individual rate of sexual development. From this it follows that the level of activity of the sex glands affects the indices of motor qualities, the level of motor activity and should have a certain influence on the function of the ovaries and the female reproductive system as a whole, especially during the period of formation of the CMC [1; 2].

In connection with this, for the direct effect of the training load on the body of a young athlete, it is necessary to use such means and methods of their use that activate muscle activity, stimulate in these muscles and other components of the functional system of deployment of mechanisms of adaptation, similar to those occurring during the competition [3; 4].

It was determined that in the period of formation of a specific biological cycle in skiers-racers and biathletes, that is, at the age of 11–15 years, the volume of ski and ski-roller training, running, imitation statistically increases from year to year ($p<0,05–0,001$). Under the influence of physical activity, the period of formation and occurrence of a specific biological cycle of young athletes 11–15 years old according to the survey and questioning took place in different ways. Thus, out of 42 female skiers-racers aged 11–15 years, 53% determined the absence of menstruation, 29% menarche or 1–2 menstruation, 12% irregular menstruation and 5% regular menstruation and from 46 biathlon women 55 % have no menstruation, 23% have menarche or 1–2 menstruation, 19% have irregular menstruation and only 3% have regular menstruation.

Thus, the formation and functioning of a specific biological cycle is significantly influenced by training loads, which requires their consideration.

Prospects for further research will be focused on the development of training programs for young female athletes 11–13 years old specializing in skiing and biathlon.

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