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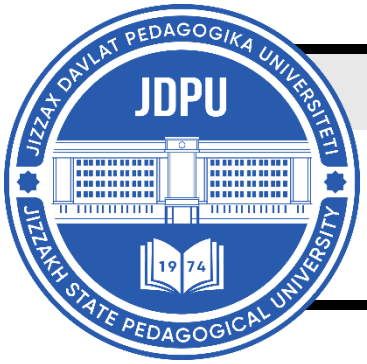

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RESEARCH ON THE PROCESS OF ADAPTATION OF THE CARDIOVASCULAR SYSTEM OF GYMNASTIC WOMEN TO TRAINING LOADS

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ABOUT ARTICLE

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Abstract: The presented article examines the problem of managing training load through monitoring the process of adaptation of the cardiovascular system to the work performed at the pre-competition training stage for 12-14 year old gymnasts.

Introduction. The adolescent period (10-17 years) is a "critical" period in the life of young athletes. Significantly increasing the intensity of the training process during this period can negatively impact adolescent girls' bodies and cause some negative consequences for their health [2,3,4.6,8,10]. It should be noted that the body of girls of this age is biologically immature and is not ready to withstand high-intensity loads without the threat of structural and functional changes [3,5,6,12,14].

However, in sports with complex coordination of movements, and particularly in rhythmic gymnastics, when planning the training process for athletes of this age (deep specialized training stage), a significant increase in training and competition loads is characteristic, aimed at achieving a high level of sports and technical mastery [7,8,9,13].

Research objective: optimization of training load parameters for gymnasts competing under the Candidate for Master of Sports (CMS) program in pre-competition and competitive mesocycles.

Organization of the research. During the pedagogical experiment, in order to include in the educational process the complexes of exercises of the Special Physical Training (SPT) and Subject Training sections, performed by a combined method, and corrective gymnastics, the indicators of the functional system of the gymnasts were recorded.

During the research, the process of athletes' body adaptation to physical activity was monitored according to the following changes:

- blood pressure (BP) (measurements were carried out using the Korotkov method regularly at the 1st minute after completing the exercises);
- work of the cardiovascular system (registration of heart rate (HR) indicators using apparatus and palpation methods - pulse wave on radial and carotid arteries).

Due to the fact that sports physiologists are aware of the age differences in these indicators for girls aged 12-13 and 14 (6.7), two subgroups were identified within the experimental group.

The norm for the blood pressure indicator in girls of this age at rest was taken as 110/66 - 112/66 mm Hg. and a permissible maximum increase at physical activity of 32±2 mm Hg. (3.6,7). Based on this, the calculated blood pressure indicators after performing the load in gymnasts should be 140/90 - 144/95 mm Hg.

Results and their discussion. The initial changes in systolic pressure indicators in gymnasts, defined as the body's reaction to a given load, did not exceed 144 mm Hg, which indicates the adequacy and "biological" nature of the developed exercise complexes. The table presents the average statistical BP indicators for gymnasts of different age groups throughout the pedagogical experiment.

Table 1.

Age (year)	With BP (mm Hg)			DAP (mm Hg)		
	norm	until	after	norm	until	after
12-13.	110 ± 32.	106±15.	120±12.	66.	71±8.	83±13.
14.	112 ± 32	111±18.	124±10.	66.	79±12.	89±11

When performing experimental exercises, the SBP indicators increased by an average of 14 mm Hg for 12-13 year old female gymnasts and 13 mm Hg for 14 year old female gymnasts. Thus, during physical exertion, the SBP threshold does not exceed - the maximum increase in SBP by 32 mm Hg.

During the experimental period, changes in heart rate (HR) indicators were noted before performing the exercise complexes and in the 1st minute after them. Figures 1, 2 show the changes in heart rate indicators recorded in gymnasts throughout the pedagogical experiment.

In the presented figures, the change in the dynamics of heart rate indicators after performing exercise complexes for gymnasts of both subgroups indicates the presence of an adaptation process to the load. But the intensity of this process in the subgroups is different. This difference is significant in the subgroup of 12-13 year old gymnasts (according to the Mann-Whitney criterion, $P<0.05$). No significant differences were found in 14-year-old gymnasts ($P>0.05$).

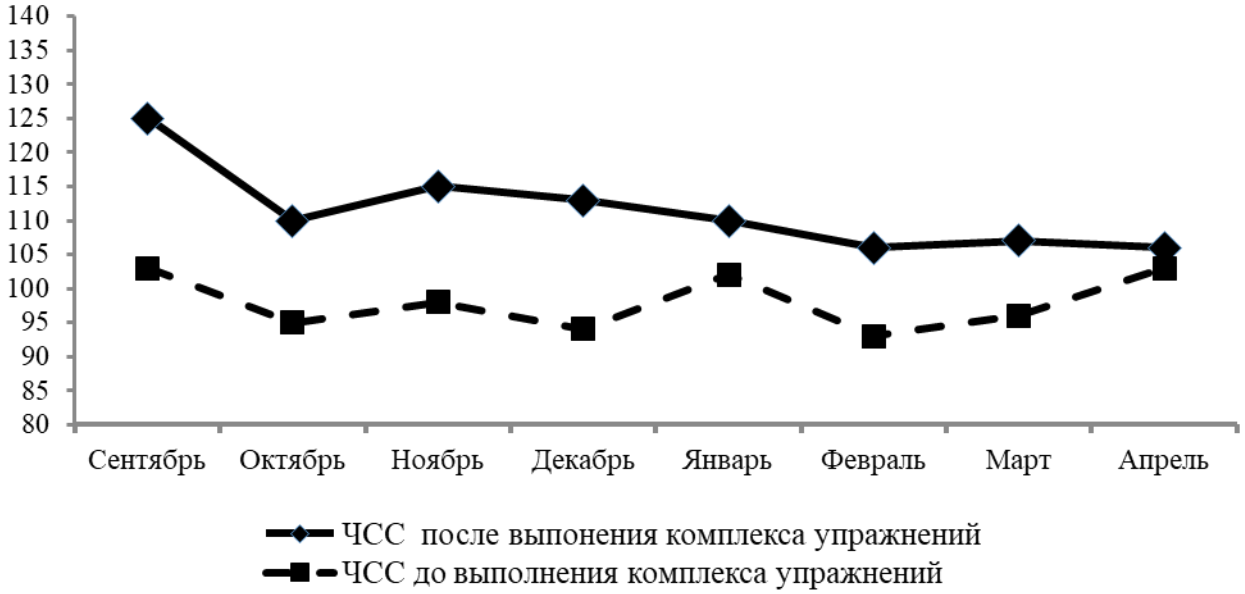

Fig. 1. Heart rate indicators when performing a set of exercises for gymnasts aged 12-13.

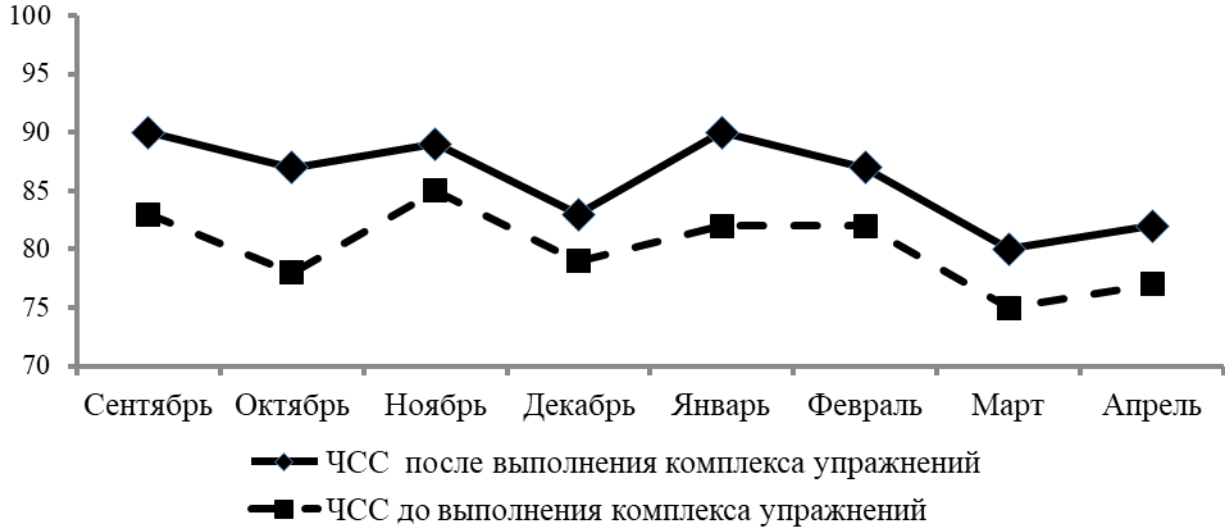

Fig. 2. Heart rate indicators when performing a set of exercises gymnasts are 14 years old

In pre-competition and competition mesocycles, training load parameters increase significantly and are often determined by coaches intuitively.

As an indicator of the load magnitude, the "intensity index" (I) was used, which was used by T.S. Lisitskaya [4] to determine the load magnitude in artistic gymnastics and adapted to modern conditions by L.Ya. Arkaev [1]:

AND= (K•E/t"total.) •200, where

K•E - the number of elements completed during the training, t"total. - total working time on the views (s), 200 - coefficient for obtaining the absolute number of training density.

Creating optimal redundancy conditions:

- the intensity of training loads in the pre-competition mesocycle should exceed the competition load by 1.5 - 2.0 times (average 1.7 times);

- the load intensity for highly qualified gymnasts is 2.60 - 2.70 elements per minute.

In gymnastics sports, the average load density is 7.5 relative units.

Similar calculation of training load volumes can also be applied to gymnasts-artists. According to the new Rules for Competitions in Rhythmic Gymnastics (2013), one composition must have 10 equivalent elements. For the competition, KMS gymnasts perform a maximum of 8 competitive compositions - "progons" (4 types of program, 4 types in the final). The calculation of the maximum number of assessed elements performed by junior gymnasts in a single competition is presented as follows: 10 elements in one composition × 8 "progons" = 80 assessed elements.

Due to the fact that training loads should exceed competitive loads by 1.5-2 times, the theoretical calculation of the required number of assessed elements that gymnasts must perform during one training session has the following values:

80 items × 1.5 = 120 estimated items (minimum), 80 items × 2 = 160 estimated items (maximum).

Consequently, the number of assessed elements performed during training by artistic gymnasts of the KMS qualification should be 120-160 elements. Since the main part of training in the competitive mesocycle most often consists of exercises "running," the calculated value of the number of "running" that gymnasts must perform during the main part of the lesson was:

120 elements: 10 = 12 "progons,"

160 elements: 10 = 16 "progons."

On average, the duration of the main part of the training session for gymnasts of this qualification is 1.5 hours. Taking into account the completed calculations of the required number of runs, the time for their execution should be 26.7 - 35.6% of the main part of the lesson.

Calculation of the "intensity index" for the main part of the training session for gymnasts performing under the KMS program:

1.5 hours = 5400 s.

I = (120:5400) × 200 = 4.4 units.,

I = (160: 5400) × 200 = 6.0 units.

The load intensity index ranges from 4.4 to 6.0 units.

Thus, the calculated load density for gymnasts-athletes of the KMS qualification does not exceed the specified optimal indicators (I = 7.5 units) for highly qualified athletes.

The calculation of the estimated number of elements that gymnasts must perform at a given load density was:

120 (estimated elements per training): 90 (min) = 1.3;

160 (estimated elements per training): 90 (min) = 1.8.

Consequently, artistic gymnasts performing under the KMS program must perform 1.3 - 1.8 (2) rated elements per minute, while in sports gymnastics, this indicator is 2.6 - 2.7 (1).

Thus, using the calculated parameters of training loads for the main part of classes in pre-competition and competitive mesocycles will allow gymnasts to improve their sports skills while maintaining their physical health.

Conclusion. For junior gymnasts, the frequency of competitions is one in two weeks. At the same time, the duration of the competitive stage in the structure of the annual macrocycle in gymnasts competing under the KMS program (according to the Competition Calendar for 2014 of the Tashkent Children's and Youth Sports School of Artistic Gymnastics) is distinguished by its long duration and intensity (for 9-10 months a year).

One of the ways to optimize the training process for gymnasts performing under the KMS program is to plan the loads in the main part of the training session, taking into account the requirements of the modern Competition Rules, on the one hand, and the physiological characteristics of the 13-15-year-old girls' bodies, on the other.

The main part of the training sessions in the competitive mesocycle consists of performing competitive compositions on a platform to music. The most relevant is the calculation of the optimal, biologically justified number of "running" per workout that gymnasts must perform. This will, on the one hand, improve the sportsmanship of gymnasts in accordance with the modern requirements of the sport, and on the other hand, reduce the risk of negative consequences of physical exertion on the body of adolescent girls.

The obtained data on the reactions of the body's systems to the load indicate that in less qualified athletes (12-13 years old), the body's reaction is somewhat higher than in more

qualified gymnasts (14 years old), which is due not only to the functional characteristics of the body of girls of this age, but also to their sports experience and qualification level.

References:

1. Аркаев Л.Я. Интегральная подготовка гимнастов: на примере сборной команды страны: дисс. ... канд. пед. наук в форме научного доклада: 13.00.04. - Санкт-Петербург, 1994. - 46 с.
2. Аркаев Л.Я в соавт. Как готовить чемпионов //Теория и технология подготовки гимнастов высшей квалификации. - М.: Физкультура и спорт, 2004. - 326 с.
3. Винер-Усманова И.А. Интегральная подготовка в художественной гимнастике. Автореф. дисс. ... д-ра пед. наук. Санкт-Петербург, 2013. -47с.
4. Волков Л.П. Теория и методика детского и юношеского спорта. Киев. Олимпийская литература. 2002. -294 с.
5. Гавердовский Ю. К. в соавт.. Спортивная гимнастика (мужчины и женщины). Примерные программы спортивной подготовки для ДЮСШ, СДЮШОР и ШВСМ. М.: 2005. – 511 с.
6. Гавердовский Ю.К. Обучение спортивным упражнениям. Биомеханика. Методология. Дидактика. М.: Советский спорт, 2008. - 912 с.
7. Лисицкая Т.С. Художественная гимнастика: Учебник для ИФК / Под ред. Т. С. Лисицкой. М.: Физкультура и спорт, 1982. – 232 с.
8. Платонов В.Н. Система подготовки спортсменов в олимпийском спорте. Общая теория и её практические приложения. - К.: Олимпийская литература, 2004. - С. 808.
9. Платонов В.Н. Двигательные качества и физическая подготовка спортсменов. Издательство «СПОРТ» М.: 2019. -630 с.
10. Рихсиева А.А. в соавт. Физическое состояние школьников и спортивной молодежи.- Т.: Ибн Сины, 1992.- 152 с.
11. Умаров М.Н., Эштаев А.К.Интегральный подход в подготовке высококвалифицированных гимнастов. // «Фан спортга». 2009. №3. –с. 45-47.
12. Умаров М.Н., Умаров Д.Х. Отбор, моделирование и прогнозирование в спорте: учебник / М.Н.Умаров, Д.Х.Умаров – Т.: «O’ZKITOBSAVDONASHRIYOTI» NMIU, 2023 -600 с.
13. Умаров М.Н. «Теория и методика гимнастики». Специально-двигательная подготовка гимнастов. [Учебное пособие]. УзГУФКС –Чирчик: 2023 г. 295 стр.

14. Чебураев В.С. Научно-методическое обеспечение подготовки сборных команд страны по спортивной гимнастике // Теория и практика физической культуры. - 1997. - № 11. - С. 44 - 46.

15. Уилмор Дж.Х., Костилл Д.Л. Физиология спорта. - К.: Олимпийская литература, 2001. - 502 с.