

Game stretching as a modern means of developing the flexibility of 5–6-year-old female gymnasts

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Abstract

Purpose: to prove the effectiveness of the technique of game stretching to increase the level of development of flexibility in female gymnasts aged 5-6 years.

Material & Methods: the study involved 30 female athletes aged 5-6 years who are engaged in rhythmic gymnastics. According to the results of the initial testing, a group of female gymnasts was divided into control (n=15) and main (n=15), taking into account the absence of significant differences in the indicators of flexibility tests. Both groups of young gymnasts trained in accordance with the curriculum for the Youth Sports School in rhythmic gymnastics (1999). In the training sessions of female athletes of the main group, a specially developed technique of game stretching was included, aimed at developing flexibility.

Results: the obtained results of the study give grounds to assert that the proposed methodology, by which female gymnasts of the main group (MG) trained, contributed to a more pronounced ($p < 0,05$; $p < 0,01$) increase in the level of flexibility development compared to the results of female athletes control group (CG), who trained according to the traditional flexibility development program. So in tests T1 "Extension in the knee joints" (cm); T2 "Twisting the stick" (cm); T4 "Gymnastic bridge" (points) significant differences in test scores were found with a probability of 99% at $p \leq 0,01$. In tests T3 "Backward bend in lying position" (cm); T5 "Performing splits on the right", (points) and T6 "Performing splits on the left", (points) there were also found significant differences in indicators with a probability of 95% at $p \leq 0,05$ between the main and control groups. However, in the T7 test "Performance of transverse splits" (points), an unreliable difference was obtained between the performance of the gymnasts of the main and control groups ($p > 0,05$), although an improvement in the results in this test was observed in both groups.

Conclusions: the results of the study showed the effectiveness of the method of game stretching to increase the level of development of flexibility in female gymnasts 5-6 years old. The technique contributed to a more pronounced ($p < 0,05$; $p < 0,01$) increase in the level of development of flexibility among female athletes of the main group (MG) compared with the results of female gymnasts in the control group (CG). So, in tests T1 "Extension in the knee joints" (cm); T2 "Twisting the stick" (cm); T4 "Gymnastic bridge" (points) significant differences in test scores were found with a probability of 99% at $p \leq 0,01$. In tests T3 "Backward bend in lying position" (cm); T5 "Performing splits on the right", (points) and T6 "Performing splits on the left", (points) there were also found significant differences in indicators with a probability of 95% at $p \leq 0,05$ between the main and control groups. The results obtained allow us to recommend the developed methodology for use in the training process of young gymnasts at the stage of initial training. And test exercises were applied that are not included in the Curriculum, such as T1 "Extension in the knee joints" (cm); T2 "Twisting the stick" (cm); T3 "Backward bend in lying position" (cm) is quite informative and can be used to control the flexibility of gymnasts at all stages of preparation.

Анотація

Альфія Дейнеко, Катажина Прусік, Інна Красова, Наталія Батієва, Михайло Марченков. Ігровий стретчинг як сучасний засіб розвитку гнучкості гімнасток 5-6 років. **Мета:** довести ефективність методики ігрового стретчингу для підвищення рівня розвитку гнучкості гімнасток 5-6 років. **Матеріал і методи:** у дослідженні прийняли участь 30 спортсменок віком 5-6 років, які займаються художньою гімнастикою. За результатами початкового тестування група гімнасток була розподілена на контрольну (n=15) та основну

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($n=15$) з урахуванням відсутності достовірних відмінностей у показниках тестів на гнучкість. Обидві групи юних гімнасток тренувались відповідно до Навчальної програми для ДЮСШ, СДЮШОР ШВСМ з художньої гімнастики (1999). У тренувальні заняття спортсменок основної групи було включено спеціально розроблену методику ігрового стретчингу, спрямовану на розвиток гнучкості.

Результати: отримані результати дослідження дають підставу стверджувати, що запропонована методика, за якою тренувалися гімнастки основної групи (ОГ), сприяла більш вираженому ($p < 0,05$; $p < 0,01$) підвищенню рівня розвитку гнучкості, порівняно з результатами спортсменок контрольної групи (КГ), які тренувалися за традиційною програмою розвитку гнучкості. Так в тестах Т1 «Розгинання в колінних суглобах» (см); Т2 «Викручування палиці» (см); Т4 «Гімнастичний міст» (бали) були виявлені достовірні відмінності показників тестування з ймовірністю 99% при $p \leq 0,01$. В тестах Т3 «Прогинання назад в упорі лежачи» (см); Т5 «Виконання шпагату на праву», (бали) і Т6 «Виконання шпагату на ліву», (бали) також були виявлені достовірні відмінності показників з ймовірністю 95% при $p \leq 0,05$ між основною і контрольною групами. Однак у тесті Т7 «Виконання поперечного шпагату», (бали) була отримана не достовірна різниця між показниками гімнасток основної і контрольної групи ($p > 0,05$), хоча покращення результатів у цьому тесті спостерігалось в обох групах. **Висновки:** отримані результати дослідження довели ефективність методики ігрового стретчингу для підвищення рівня розвитку гнучкості гімнасток 5-6 років. Методика сприяла більш вираженому ($p < 0,05$; $p < 0,01$) підвищенню рівня розвитку гнучкості спортсменок основної групи (ОГ), порівняно з результатами гімнасток контрольної групи (КГ). Так в тестах Т1 «Розгинання в колінних суглобах» (см); Т2 «Викручування палиці» (см); Т4 «Гімнастичний міст» (бали) були виявлені достовірні відмінності показників тестування з ймовірністю 99% при $p \leq 0,01$. В тестах Т3 «Прогинання назад в упорі лежачи» (см); Т5 «Виконання шпагату на праву», (бали) і Т6 «Виконання шпагату на ліву», (бали) також були виявлені достовірні відмінності показників з ймовірністю 95% при $p \leq 0,05$ між основною і контрольною групами. Отримані результати дають підставу рекомендувати розроблену методику для використання в навчально-тренувальному процесі юних гімнасток на етапі початкової підготовки. А застосовані тестові вправи, що не входять в Навчальну програму, такі як Т1 «Розгинання в колінних суглобах» (см); Т2 «Викручування палиці» (см); Т3 «Прогинання назад в упорі лежачи» (см) є достатньо інформативними і можуть використовуватися для контролю гнучкості гімнасток на всіх етапах підготовки.

Introduction

Rhythmic gymnastics is one of the most popular Olympic sports around the world. Its specificity is manifested in the need for female athletes to perform a large number of complex coordination movements of a free nature, which are combined into a competitive composition that harmoniously combines technical skills, virtuosity, expressiveness in performing complex body movements in combination with object manipulations accompanied by musical accompaniment. The versatility of the means (dance steps, jumps, turns, balances, waves, inclinations, etc.) allow solving a variety of tasks of the physical, aesthetic, emotional, spiritual development of

female athletes (Montosa et al., 2018; Deyneko & Shevchuk, 2019; Semyzorova & Krasova, 2021; Myroshnychenko, 2006; Rutkauskaitė & Skarbalius, 2012; Vernetta et al., 2017; Sutula, 2018; et al.). Analyzing the current state of rhythmic gymnastics, the authors of Osta et al. (2021) note that in order to be competitive in the international arena, female athletes need to quickly adapt to the development of the sport and changes in competitive rights, which requires mastering a large number of complex and latest technical movements in conditions of high intensity training. An analysis of the competition rules of this Olympic cycle (2022-2024) showed that the compositions of female gymnasts were filled with more dynamic elements, during which it is very important to fix the required amplitude of movement, which is unattainable without an appropriate level of flexibility development. Therefore, the requirements for its manifestation are becoming ever higher, and the issue of its development is more relevant already at the stage of initial training of young female gymnasts. The rhythmic gymnastics curriculum suggests that already at the age of 5-6 years, female athletes should learn a large number of basic exercises, the implementation of which requires a certain level of special physical qualities, including flexibility (Khudozhnaya himnastyka dlya dytyachy-yunats'kykh sportyvnykh shkil, spetsializovanykh shkil olimpiys'koho rezervu, shkil vyshchoyi sportyvnoyi maysternosti, 1999). But the development of flexibility in female athletes aged 5-6 years is a very complex and painful process, both physically and mentally, and with the traditional forcing of the training process, already at this age, you can forever reflect the desire of the child to do gymnastics. Therefore, the search and use of modern, interesting, non-traumatic and effective methods of developing flexibility at the stage of initial training is one of the main areas of work for many specialists around the world. One of these areas is the use of game stretching techniques – specially selected exercises for stretching all muscle groups, carried out in a game form (Nechyporuk et al., 2016). The results of the studies of these specialists indicate that this technique is based on static stretching of the muscles of the body and the joint-binding apparatus of the arms, legs, spine, which contributes to the development of flexibility and has a deep healing effect on the entire body of the child. It is this method that helps the coach improve physical qualities, give emotional coloring and introduce elements of competition into the training process of young gymnasts. However, in the practice of training activities in rhythmic gymnastics, the technique of game stretching as a means of developing flexibility has not found wide application. This is most likely due to the fact that at present there are almost no scientific and methodological developments on its use in rhythmic gymnastics. Consequently, the issues related to the peculiarities of the application of game stretching techniques in the training process of female gymnasts aged 5-6 years are little studied, relevant and of interest to scientific research.

Connection with scientific programs, plans, topics. The study was conducted in accordance with the initiative topic of the scientific research of the Department of Gymnastics, Dance Sports and Choreography of the KhSAPC: "Theoretical and methodological foundations for the development of backbone components of physical culture (sports, fitness and recreation) for 2020-2025, state registration number 0120U101215".

Purpose of the study: to prove the effectiveness of the technique of game stretching to increase the level of development of flexibility in female gymnasts 5-6 years old.

Material and Methods of the research

Participants

The study involved 30 female gymnasts 5-6 years old, who train in the initial training group of the first year of study. From young female athletes, two groups were formed: the main (MG) and control (CG) of 15 female gymnasts in each. All female gymnasts and their parents were informed about the nature of the study and gave informed consent to participate in the study and to process the data obtained.

Methods

To achieve the goals set during the study, pedagogical testing, a pedagogical experiment, and methods of mathematical statistics were used. To assess the level of development of the flexibility of athletes aged 5-6, 7 test items were selected, 57% of which are offered by the Curriculum for Youth Sports School in rhythmic gymnastics (1999). So, to determine the mobility (flexibility) in the knee joint, a test exercise was used: "extension in the knee joints", the exercise "twisting the stick" – to determine the mobility (flexibility) in the shoulder joints, tests "bending back in the lying position" and "gymnastic bridge" – to determine the mobility (flexibility) in the spine, and with the help of the tasks "Performing three splits (on the right, left, transverse)" in the hip joints.

Statistical analysis

Statistical analysis of the results obtained was carried out using descriptive statistics indicators using licensed Excel spreadsheet packages and a set of built-in functions. The characteristics of descriptive statistics were determined: the arithmetic mean and the standard deviation. The assessment of the statistical significance of the results of a comparative analysis of the indicators of the main and control groups that were studied was carried out using the non-parametric Rosenbaum test (Q).

Procedure

Based on the results of the initial testing, the group of female gymnasts was divided into the main (n=15) and control (n=15) groups, taking into account the absence of significant differences in the indicators of the proposed tests. The level of development of the flexibility of young female athletes was tested twice – at the beginning (October) and at the end of the training year (May). Both groups of young female gymnasts trained in accordance with the Curriculum for Youth Sports School, in rhythmic gymnastics. However, in the training sessions of female gymnasts of the main group (n=15), a technique was used to develop flexibility, which included means of game stretching. Taking into account the fact that gaming activity is the main component of the educational material of the Program at the stage of initial training, the emphasis in the developed methodology was placed on the integrated development of physical qualities through the game, but with the dominance of exercises for flexibility. Training sessions with the use of game stretching exercises were held 3 times a week for 90 minutes. The duration of the study was 6 months (October-March).

Game stretching is a health-improving technique that is aimed at strengthening the musculoskeletal system with the help of stretching exercises, mostly of a static nature, which helps prevent injury, promotes the formation of correct posture, and corrects its shortcomings.

The developed technique of game stretching, firstly, was adapted to the training process of young female gymnasts, corresponded to their age characteristics and level of preparedness; secondly, it assumed the implementation of gaming opportunities in order to improve and develop the physical

and mental qualities of young female athletes; thirdly, the exercises were imitation in nature and were performed at a slow, calm pace in order to exclude injuries; fourthly, the exercises used in the methodology did not contradict the material of the Curriculum; fifthly, a positive emotional background always reigned in the training sessions.

The developed methodology provided for the use of plot-based game complexes of exercises in the preparatory, main and final parts of each training session. The time devoted to playing stretching exercises depended on the tasks of the lesson and ranged from 25 to 40 minutes. One lesson per week consisted entirely of outdoor games and game stretching exercises. The exercises consisted of imitative actions and images, carried out to the appropriate musical accompaniment of classical or folk music in the form of a story game or complexes of interrelated game situational exercises aimed at developing flexibility in combination with exercises for developing coordination abilities, strength and endurance. At each lesson, a combination of dynamic and static modes of muscle work was mandatory. By stretching and relaxing the muscles rested. The alternation of exercises in their direction was mandatory in order to eliminate fatigue and monotony of classes, as well as to increase the effect of exercises on the body of young female gymnasts. The play complexes included exercises with children's items: balls, hoops, ribbons, maces, which contributed to a more detailed acquaintance of the girls with these items, and also made it possible to interest them and increase motivation for further rhythmic gymnastics. Also, specially designed game exercises in balance, in pairs and on the gymnastic bench were widely used in the methodology. So, in the preparatory part, during the warm-up, game stretching exercises were carried out as a means of preparing muscles and tendons for the implementation of the training program: "Penguin", "Tumbler", "Snake", "Ant", etc. They were usually performed after dynamic exercises, gradually increasing the range of motion and the complexity of the exercises themselves. In the main part of the training session, to develop flexibility and increase the elasticity of muscles and ligaments, such game stretching exercises were used as: "Fish", "Dolphin", "Starfish", "Shell", "Ring", "Bridge", "Mouse", "Tiger", "Frog", "Butterfly", "Firebird", "Gymnast", "Ballerina", "Cobra", "Snail", "Swimmer", "Swing", "Ostrich", "Fox", "Boa", etc., which were associated with the names of animals, birds, flowers and imitative actions. These exercises were performed in series, alternating with program exercises of rhythmic gymnastics or simultaneously with strength exercises. As the exercises were mastered, they became more complicated due to the inclusion of elements of novelty in them, the use of objects (balls, ropes, hoops, maces). Young female athletes were given the opportunity to independently come up with flexibility exercises to the music. It should be noted that the girls enjoyed this opportunity, demonstrating confidence, artistry, ease, freedom and coordination of movements. It should be noted that if the development of flexibility was one of the main tasks of the training session, then the proposed game stretching exercises were performed in the second half of the main part of the session, as a separate independent "block" of the load. In the final part, game stretching exercises were also used as a means of recovery after training loads and prevention of injuries of the musculoskeletal system: "Twig", "Gingerbread Man", "Owl", etc. They were necessarily combined with relaxation exercises.

It should be noted that in the developed methodology, special attention was paid to the feedback between the coach, the female athlete and parents. Thus, individual home-

work assignments were developed and, with the help of their parents, young female athletes completed them, as a result of which they developed the skills of independent activity and responsibility. Home tasks were not episodic, but constituted a certain system of interaction between the coach, parents and gymnasts throughout the study. They included a number of game stretching exercises, closely related to each other in such a way that the next one could be performed only if the previous one was mastered. The homework system provided for mandatory control, on the one hand by the coach, on the other hand, by the parents. The focus of the developed tasks was of four types: on the development of flexibility either in the knee, or shoulder, or in the hip joint, or in the spine. When performing these exercises, the child imagined himself in the form of a snake, a hare, a fox, a frog, a goldfish, and other interesting and well-known characters. So, the system of home tasks was a form of attracting female gymnasts 5-6 years old to regular physical exercises and contributed to self-improvement and assimilation of educational material.

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Thus, the content of the developed methodology using the means of game stretching not only floated on the development of the flexibility of female gymnasts 5-6 years old, but also contributed to the development of the exercises of the classification program for groups of initial training.

Results of the research

At the beginning of the study, testing of the flexibility development of female gymnasts aged 5-6 years of the main and control groups was carried out, the indicators of which are presented in Table 1.

Using the Student's criterion, it was found that the obtained statistical indicators have unreliable differences in the results for all the proposed tests and state an acceptable difference in the initial level of flexibility of female gymnasts in both groups (Table 1).

Table 1
Indicators of the development of flexibility of female gymnasts aged 5-6 at the beginning of the study
($t_{gr.} = 2,05$ at $p < 0,05$)

No i/o	Name of the test	$\bar{X} \pm m$		t_p	P	
		Main group (n=15)	Control group (n=15)			
T1	Flexibility in the knee joint «Extension in the knee joints», cm	2,13±0,30	1,73±0,19	1,13	>0,05	
T2	Flexibility in the shoulder joints «Twisting the stick», cm	51,33±3,42	55,00±2,20	0,90	>0,05	
T3	Flexibility in the spine	“Backward bend in lying position”, cm	43,87±1,52	41,53±2,13	0,89	>0,05
T4		“Gymnastic bridge”, points	4,27±0,35	4,97±0,41	1,30	>0,05
T5	Flexibility in the hip joints «Performance of three splits», points	right	5,30±0,43	4,97±0,28	0,65	>0,05
T6		left	3,63±0,33	4,23±0,32	1,29	>0,05
T7		transverse	3,23±0,35	3,97±0,33	1,52	>0,05

Table 2
Indicators of flexibility development of female gymnasts 5-6 years old at the final stage of research
($t_{gr.} = 2,05$ at $p < 0,05$)

No i/o	Name of the test	$\bar{X} \pm m$		Q (S1+S2)	Qcr	
		Main group (n=15)	Control group (n=15)			
T1	Flexibility in the knee joint «Extension in the knee joints», cm	3,60 ± 0,83	2,76 ± 0,75	9	p < 0,01	
T2	Flexibility in the shoulder joints «Twisting the stick», cm	33,93 ± 4,61	40,33 ± 7,15	9	p < 0,01	
T3	Flexibility in the spine	“Backward bend in lying position”, cm	25,67 ± 4,65	28,00 ± 6,30	6	p < 0,05
T4		“Gymnastic bridge”, points	6,50 ± 1,10	5,97 ± 0,97	9	p < 0,01
T5	Flexibility in the hip joints «Performance of three splits», points	right	7,43 ± 1,37	5,87 ± 1,20	8	p < 0,05
T6		left	5,53 ± 1,27	4,59 ± 0,99	6	p < 0,05
T7		transverse	5,23 ± 1,33	4,73 ± 1,08	4	p > 0,05

At the final stage of the study, after 6 months of training according to the developed methodology using the means of game stretching, a re-testing of the development of flexibility of young female gymnasts of the main and control groups was carried out. The results obtained are presented in table 2.

At the final stage of the study, the evaluation of the effectiveness of the developed methodology was carried out using the non-parametric Rosenbaum criterion, which made it possible to analyze the reliability of differences in the average statistical values of the indicators of the level of development of the flexibility of young athletes from the main and control groups. In fact, the results of all tests revealed reliable changes in the obtained characteristics. So in tests T1 "Extension in the knee joints" (cm); T2 "Twisting the stick" (cm); T4 "Gymnastic bridge" (points) significant differences in test scores were found with a probability of 99% at $p \leq 0,01$. In tests T3 "Backward bend in lying position" (cm); T5 "Performing splits on the right", (points) and T6 "Performing splits on the left", (points) there were also found significant differences in indicators with a probability of 95% at $p \leq 0,05$ between the main and control groups. However, in the T7 test "Performance of transverse splits" (points), an unreliable difference was obtained between the performance of female gymnasts in the main and control groups ($p > 0,05$), although an improvement in the results in this test was observed in both groups. This may be due to the specificity and complexity of the work on flexibility when teaching splits. To improve the result when performing this exercise, specially directed gymnastic means are needed. However, the obtained significant changes in the results of six tests prove the effectiveness of the proposed method using the means of game stretching to increase the flexibility level of female gymnasts 5-6 years old.

Discussion

In the course of the study, results were obtained that confirm and complement the developments of domestic and foreign scientists on topical issues of rhythmic gymnastics. Thus, the theoretical positions formulated in the works of Miroshnichenko (2006), Rutkauskaitė and Skarbalius (2012), Montosa et al. (2018), Deyneko and Shevchuk (2019) that rhythmic gymnastics is a very specific sport, not only technically, but also physically, therefore, it requires a high level of preparedness from female gymnasts. Confirmed data from both Ukrainian and foreign experts (Stadnik et al., 2010; Sosina & Ruda, 2019) that the vast majority of elements, namely jumps, balances, turns and tilts, should be performed with the maximum amplitude, requiring from female gymnasts of the optimal level of development of mobility of the spine, hip and shoulder joints. The results of a study by Sosina and Ruda (2009) showed that female gymnasts should show a high level of flexibility in 95% of bends, 78% of jumps, 60% of balances and 58% of turns. Therefore, without an appropriate manifestation of mobility in the joints, gymnasts will not be able to perform at a high technical level, naturally, virtuously and expressively, a competitive composition and show a sufficient sports result (Sosina & Ruda, 2009; Semyzorova & Krasova, 2021). This position is also confirmed by the studies of Bordalo et al. (2015), Polat and Gunay (2016). In this regard, the natural desire of specialists (Andreeva, 2010; Deyneko & Bilenka, 2021; Semyzorova & Krasova, 2021) to solve the problems of improving the quality and efficiency of the training process in rhythmic gymnastics on the development of flexibility.

Based on scientific research by Miletić et al. (2004), Sosina and Ruda (2009), Andrieva (2010), Bordalo et al. (2015),

Polat and Gunay (2016), Semyzorova and Krasova (2021) confirmed the data that the proper level of flexibility of female athletes is a prerequisite for the effective performance of all basic gymnastic elements – jumps, balances, turns and bends.

An analysis of literature sources (Danish, 2002; Netchyporuk et al., 2016; Deyneko, 2017; Deyneko et al., 2021; Deineko et al., 2022; Quan Bai, 2022) revealed a unanimous opinion of domestic and foreign experts regarding 5-6 years are in the "play period", the game becomes more imaginative, logical and social, creating the prerequisites for consolidating motor skills and developing physical qualities. The results of the conducted studies supplement the data of Sosina and Ruda (2009), Andryeyeva (2010), Bobo-Arce and Mündez-Rial (2013), Bordalo et al. (2015), Polat and Gunay (2016), Semyzorova and Krasova (2021) et al., on the use of flexibility development tools and methods used in rhythmic gymnastics training sessions.

The analysis of foreign scientific literature allows us to state that since the early 1980s, static stretching has been considered an effective method of increasing the range of motion and flexibility, reducing the risk of injury during exercise (Shrier, 2005; Kay et al., 2015; et al., 2017; Konrad et al., 2017). We also agree with Boligon et al. (2015) that the level of development of flexibility directly affects the performance of various movements that provide a higher technical level of female gymnasts and, as a result, improve sports results.

It is important to note that in recent years, new modern types of physical activity have been widely spread all over the world, one of which is stretching. Biletska et al. (2015) consider «Stretching» as a system of specially fixed positions of certain parts of the body, that is, static stretching. Issues of stretching are also discussed by foreign scientists. Thus, numerous studies (Kay et al., 2015; Konrad et al., 2017) indicate that static stretching is widely used in sports practice in order to sharply increase the range of motion of the joint. As you know, flexibility must be developed from the moment of early specialization in all sports, including rhythmic gymnastics. Therefore, such a sparing and effective mode of muscle work, which meets the specifics of game stretching exercises, is quite suitable for developing the flexibility of female gymnasts at the stage of initial training. The analysis of the scientific and methodological literature (Rukhlyvi ihry: z metodykou vykladannya, 2014; Deyneko, 2017; Deyneko et al., 2021; Deineko et al. 2022) confirms the effectiveness of using the game method at the stage of initial training in gymnastic sports

Conclusions

The results of the study showed the effectiveness of the game stretching technique for increasing the level of development of flexibility in female gymnasts aged 5-6 years. The technique contributed to a more pronounced ($p < 0,05$; $p < 0,01$) increase in the level of development of flexibility among athletes of the main group (MG) compared with the results of gymnasts from the control group (CG). So, in tests T1 "Extension in the knee joints" (cm); T2 "Twisting the stick" (cm); T4 "Gymnastic bridge" (points) significant differences in test scores were found with a probability of 99% at $p \leq 0,01$. In tests T3 "Backward bend in lying position" (cm); T5 "Performing splits on the right", (points) and T6 "Performing splits on the left", (points) there were also found significant differences in indicators with a probability of 95% at $p \leq 0,05$ between the main and control groups. The results obtained allow us to recommend the developed methodology for use in the train-

ing process of young female gymnasts at the stage of initial training. And applied test exercises that are not included in the curriculum, such as T1 "Extension in the knee joints" (cm); T2 "Twisting the stick" (cm); T3 "Backward bend in lying position" (cm) is quite informative and can be used to control the flexibility of female gymnasts at all stages of preparation.

Prospects for further research are the introduction of game stretching tools into the educational and training process of the Youth Sports School, clubs and specialized educational institutions for the comprehensive development of physical qualities and further improvement of young female gymnasts at the stage of initial training.

Author Contributions

Alfiia Deineko: collection, data entry, statistics.
Katarzyna Prusik: design, study planning.
Inna Krasova: data interpretation, manuscript preparation.
Nataliya Batieieva: analysis, literature search.
Marchenkov Mikhailo: literature search, fundraising.

Conflicts of Interest

The authors declare no conflict of interest.

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