

Spring Ability Development Among 9–10 Year-Old Female Gymnasts

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Abstract—The article presents the results of the development level of spring ability among 9-10 year-old female gymnasts using the method of cyclic training. High level of spring ability is necessary in sports gymnastics in order to achieve high results, as spring ability is the main factor in such kinds of gymnastic combined events as horse vault, calisthenics exercises and a balance beam, where the program of competitions becomes complicated every year.

Keywords—*sports gymnastics; spring ability; cyclic training.*

I. INTRODUCTION

In Russian system of physical upbringing gymnastics is one of the main means of health improvement, physical development, organism cold hardening, vital motor abilities and skills formation [1].

Gymnastics is one of the beautiful, dynamic, spectacular and popular kinds of sport, which includes competitions at gymnastic apparatus, in free exercises and horse vault. It is the part of the Olympic Games program. World and Europe championships, World Cups and other prestigious International tournaments are regularly held.

One of the distinctive features of gymnastics is lessons and competitions organization according to the principle of combined events. It is typical for gymnasts of all categories. It influences the whole system of training gymnasts and especially on the methodology of training. The typical feature of gymnastics is the opportunity to combine different exercises. Different in structure and difficulty elements combination provides motor skills mastering and develops physical and psychological qualities [1].

Depending on the aims and objectives of the definite contingent of athletes – gymnasts training, apart from the exercises included into the programs of sports competitions, in sports gymnastics the following exercises are widely used: exercises from free calisthenics and choreography, general development exercises without things and with

things, acrobatic exercises, running, jumps, exercises with the bar, outdoor games and sports games and others. Such wide spectrum of exercises use provides many-sided physical and technical readiness of gymnasts.

Among many kinds of sport for gymnastics it is typical to have not natural kinds and forms of exercises.

The first peculiarity is almost complete absence of the motor skills among the gymnast beginner, which he could use in a new for him or her specialized motor activity. Directed physical abilities development is one of the main preconditions for high results achievement [3].

The urgency of this research work is in the fact that spring ability is considered one of the leading characteristics of motor activity and by many authors it is defined as the ability to realize maximum muscle and volitional efforts concentration within the minimal time period in terms of vertical and horizontal distance overcoming [2,3,6,7,8].

In many kinds of sport the definite level of this quality development is demanded. A high level of spring ability is necessary in sports gymnastics, as spring ability is the main factor in such kind of gymnastic combined events as horse vault, calisthenic exercises and a balance beam, where with each year the program of competitions becomes more complicated. Special exercises use in order to develop the definite level of spring ability increases the effectiveness of educational-training process. For female gymnasts it is typical to have intensive spring ability indices increase during the first two years of training, then considerably even results increase is seen till they are 12-14 years-old. The achieved by this age level of spring ability is preserved during sports lessons [2,6].

However, in scientific-methodical literature structural elements of spring ability, its different characteristics, adequate evaluation criteria of each characteristic development are not considered enough.

Thus, there appears a contradiction between the increasing difficulty of gymnastic exercises on the one hand and a detailed consideration of spring ability development problem among 9-10 year old female gymnasts on the other hand.

This contradiction defined the problem of the research: to reveal the level of spring ability development among 9-10 year-old female gymnasts.

This problem solution was the aim of our research work.

The object of the research work is educational-training process of 9-10 year old female gymnasts.

The subject of the research is spring ability development among 9-10 year-old female gymnasts.

In accordance with the set aim we defined the following objectives of the research work:

1. To define means and methods of spring ability development among female gymnasts.
2. To reveal the level of spring ability development among 9-10 year-old female gymnasts.

Hypothesis of the research: it is supposed that cyclic method of training use during physical training would help to increase the level of spring ability among 9-10 year-old female gymnasts.

II. RESEARCH METHODOLOGY

Scientific-methodical literature analysis and synthesis, questioning method (a conversation), pedagogical observation, testing, pedagogical experiment, mathematical-static methods of the received results handling according to Student t-test.

The research was held in three stages.

The first stage (September-October 2018) included scientific and methodical literature analysis, the object and subject of the research, its aim and objectives determination, hypothesis formulating.

On the basis of the studied materials we created the plan of pedagogical research.

The second stage (October 2018-April 2019). During this stage pedagogical experiment was carried out. The method of cyclic training was introduced into the training process in order to develop spring ability among 9-10 year-old female gymnasts.

Experimental base was the following: municipal budgetary establishment of additional education "Sports school for children and teen-agers №1" in Novocheboksarsk and budgetary establishment "Sports school of the Olympic reserve №6" in Cheboksary (Chuvash Republic). Two groups were created, each included 10 9-10 year-old female gymnasts.

During the third stage (April-May 2019) we analyzed and summarized the received results, made conclusions.

During the research comparative analysis was held of spring ability development level among 9-10 year-old fe-

male gymnasts. In the control group physical training lessons were held according to generally adopted methodology. The distinctive feature of physical training lessons in the experimental group became the complex of exercises for spring ability development using the method of cyclic training. The lessons were held 3 times a week, 20-30 minutes each.

III. RESULTS

Cyclic training is a special form of physical training lessons. It provides gradual passing through several stations-training simulators and special exercises fulfillment with the help of these training simulators. The character of cyclic training, the same as the load, can vary within great ranges [12; 21].

One of the main rules of cyclic training in physical training of gymnasts is their independent character. The second rule is gymnast's purely physical readiness to it. All exercises should be directed toward all muscle groups and motor qualities development [12; 21].

The main attention was paid to the quality of exercises fulfillment, not just to maximum volume of work.

Apart from the jumping exercises themselves we also used the exercises for flexibility and dexterity development, as these qualities influence directly spring abilities development.

The main condition for flexible and effective training process control is constant monitoring of all its components: taking into account and analysis of the whole volume of the realized by the athlete work and the athlete's state control (reaction to the training load).

The base of the jumping training formed the following exercises, included into the complex of exercises of cyclic training, together with the exercises for other physical qualities development:

1. Upward jumps + upward jumps from squat position with weight (on legs, weight 500gr.). Fulfilled on a gymnastic rug during 30 seconds (15+15 seconds).
2. Jumps over gymnastic benches with weight (weight on legs, weight 500 gr.). Fulfilled continuously during 30 seconds.
3. Jumps in gymnastic pit with foam rubber filler. Fulfilled during 30 seconds with low intensity.
4. Long jumps. Fulfilled without stops between the jumps within 30 seconds.
5. Jumps on gymnastic bench (height <45 cm). Fulfilled continuously within 30 seconds with the average intensity. Pushing off and landing on two legs.
6. Jumps over a low balance beam (height <20 cm). Fulfilled continuously within 30 seconds. The jumps are fulfilled with legs straightening in the phase of flight.
7. Squats with weight (2kg). Fulfilled within 30 seconds. Squats are fulfilled with a straight back till the position of half-knee bend.

8. Skipping. Fulfilled continuously within 30 seconds. Jumps are fulfilled on a solid ground.

The test was held among the respondents from the both groups. It included control tests of spring ability indices. During control tests selection we took into account the following theses:

- the test was held in the same (standard) for all respondents conditions;
- control exercises were available for all respondents and were selected taking into account their level of readiness.

Each test was measured by quantitative and qualitative indices ():

Each test was measured by quantitative and qualitative indicators (centimeters):

1. Outleaps from the place with two legs push with arms sway (using Abalakov tape) (cm).
2. Outleap upwards with one step with the help of one leg push with arms sway (cm).
3. Standing long jump with two legs push with arms sway (cm).
4. Outleap upwards on one leg with arms sway (using Abalakov tape) (cm).
5. Outleap upwards after the spring down with arms sway (cm).

Testing was held before and after the pedagogical experiment and it helped to see the dynamics of spring ability change during our research.

The main objective of pedagogical experiment was the effectiveness revelation of cyclic training method during physical training lessons for spring ability development among 9-10 year-old female gymnasts. Cyclic training was realized by means of the results comparison of the experimental and control groups. The research results are presented in table I.

TABLE I. SPRING ABILITY INDICES AMONG 9-10 YEAR-OLD FEMALE GYMNASTS BEFORE AND AFTER THE PEDAGOGICAL EXPERIMENT.

Studied indices	Results of testing				Validity
	Before the experiment		After the experiment		
	Experimental group	Control group	Experimental group	Control group	
Outleaps from the place with two legs push (cm)	250±1,1	257±1,4	295±1,4	291±1,5	P≤0,05
Standing long	1633±3,5	1636±4,9	1692±3,6	1688±4,9	P≤0,05

jump with two legs push (cm)					
Outleap upwards after the spring down (cm)	234±1,4	235±1,5	281±1,9	269±1,7	P≤0,05
Outleap upwards on one leg from the step (cm)	196±1,3	196±2,3	229±1,4	224±2,3	P≤0,05
One leg jump from standing position (cm)	161±1,3	179±1,3	189±1,4	200±1,2	P≤0,05

IV. CONCLUSION

As the results analysis showed the respondents from both groups had spring ability indices increase during the experiment.

However, in the experimental group the tempo of increase was considerably higher.

The level of spring ability in case of directed lessons increase, anticipating natural indices increase of this quality.

The indices of outleaps from the place with two legs push in experimental group increased for 45 cm (15,3%), in the control group – 34 cm (11,7%).

The indices in standing long jump with two legs push in the experimental group increased for 57 cm (3,4%), in the control group - 45 cm (3,1%).

The indices in outleap upwards after the spring down in the experimental group increased for 47 cm (16,7%), in the control group-34 cm (12,6%).

The indices in outleaps upwards on one leg from one step pushing in the experimental group increased for 33 cm (14,4%), in the control group - 28 cm (12,5%).

The indices of outleaps upwards on one leg from standing position in the experimental group increased for 28 cm (14,8%), in the control group- 21 cm (10,5%).

The effectiveness of the jumping exercises with the offered methodological orientation was revealed during the pedagogical study.

The results analysis shows that with physiological functions formation and development, joint apparatus and big muscle groups strengthening there is speed and power oriented indices increase and coordinating qualities improve-

ment, including spring ability.

However, the research showed that the rhythm of movements mastering happens as a result of specially organized educational-training process.

The research results help to state higher increase of spring ability in the experimental group in comparison with the control group.

Thus, the results of the pedagogical experiment prove the effectiveness of cyclic training method use during physical training lessons for spring ability development among 9-10 year-old female gymnasts.

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