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METHODOLOGICAL ASPECTS ON LEARNING THE HANDSTAND JUMPING TO 9 YEAR-OLD GYMNASTS

***Potop Vladimir*[1]**
***Jurat Valeriu*[2]**
[1] *Ecological University from Bucuresti, Romania*
[2] *State University of Physical Education and Sport, Chisinau, Republic of Moldova*

Abstract. *This paper aims to present methodological aspects of learning the handstand jump to the level III of junior gymnasts, level 1 (9 years). The given issue was the basis of the elaboration of an experimental study conducted in organizational conditions within the gymnastics department of the Dynamo Sports School Club in Bucharest. The study included a single experimental group consisting of 6 beginner gymnasts aged 7-9 years selected from the whole group. There were used control samples during the training to check the level of physical and technical training, but the succession of the learning methodology of handstand tumbling jump consisted of conditioning exercises for learning their phasic structure. The results of the study highlight the improvement in running speed, muscular back force and scapular belt, last but not least, the force of the lower limb muscles (detente). In terms of technical training, improvement of fixed point landing, spatial-temporal orientation and combination of the phasic structure according to the requirements of the ranking program among the junior gymnasts III, level 1 (9 years) is highlighted. The results of the correlation between the tests and between means reveal that standing jump learning also influences the landing in other apparatus (uneven parallels, beam and floor). But the knowledge of the structure of the jump phases, of the main execution requirements and of the relations between the components of the structures, allows the correct establishment of the learning stages, the selection of the most suitable conditioning and assisting exercises, the easy identification of the causes of the mistakes, as well as their means of correction.*

Keywords: *gymnastics, jump with support, physical training, technical training, performance.*

Introduction. Currently artistic gymnastics has registered remarkable progress, highlighting the fact that it develops in accordance with the performance sports trends, but it has its specific peculiarities, such as: increasing the sports mastery, growth and competition of the competitive programs complexity, processing of the new complex exercises, the attainment of the sporting mastery approached to virtuosity; improving components to ensure the training of the high-ranked gymnasts [2, 7, 13].

In recent years, there has been a continuing "pursuit" after elements and difficult connections, especially since those already presented in competitions are continually disqualified due to the increase in the number of gymnasts who are able to introduce such elements and connections in their exercises. Gymnastics specialists were concerned about the "race of difficulties" and the increase of the executions quality. There has been a tendency to limit the number of difficult and risky elements required by the competition regulations, as well as a better correlation of the special requirements with the level of training and the age of performance gymnastics practices [9].

In male artistic gymnastics, jumps were performed on the pommel horse placed in length, and in female artistic gymnastics, the pommel horse was placed transversely, using a semi-elastic trampoline as well as a take-off track. Currently jumping occurs in both disciplines on the jumping table, varying their height according to the classification category. All standing jumps has a common feature, determined by the phases that make up their complete deployment, namely: the movement, the jump on the trampoline, the first flight, the

hand beating on the jumping table, the second flight and the landing. The difficulty and amount of jumping is appreciated both by the height and length of the flights, especially the second one, and by the bends made in different axes during the course [10, 17, 18].

For a jump to be effective and aesthetic, male / female gymnasts must possess multiple motor skills, namely: speed, strength, skill; elasticity, orientation in space; as well as a series of mental qualities such as: the judgment; courage; self-confidence; perseverance; self-control, etc. [1, 4, 7, 15, 17, 18].

Gymnastics teaches acts and motor actions (elements, bindings) based on experimental patterns that eventually lead to motor conduct, a behaviour that is given by mastery in execution, but also by a system of knowledge specific to gymnastics. The learning process of gymnastic movements is a complex process that includes, besides gestural, motor learning at the level of skills and abilities, forms of intelligent learning, including the acquisition of notions, concepts and creative learning [9, 11, 14].

From a methodical point of view, the process of learning in gymnastics can be divided into three stages: the stage of initiation; the consolidation stage and the improvement stage. Depending on the learning stage, in motor gymnastic learning - as a training process - the whole system of methodical training methods and procedures is used. Methods and procedures are used according to the physical and technical training of the gymnast, the degree of difficulty and structure of the technical element, the learning phase [6].

In using the analytical training, the coach has to go through the following steps (Schmidt R., 1991): to analyze the components of a movement, decide which components can benefit from the increase of automatism and provide an optimal number of exercises of isolated parts [11].

Algorithmic programming method - represents a succession of logical exercises, which comprise components of the element to be taught. Three sets of exercises are used in algorithmic learning [5, 14, 16, 18]:

- Set I – the physical support necessary to execute the movement is achieved;
- Set II – the actual learning of the element is achieved;
- Set III – the consolidation and improvement of the learned technical element is achieved.

The main aim of the paper is to present methodological aspects on the learning the handstand jump to the junior gymnasts level III, level 1 (9 years).

The hypothesis of the work

Knowledge of the structure of the phases of the jump, the main execution requirements and the relationships between the components of the structures will allow the correct establishment of the learning stages, the selection of the most suitable conditioning and auxiliary exercises, the easy identification of the causes of the mistakes, as well as the means of remediation them.

Methodology and organization of research

This issue was the basis for the elaboration of an experimental study carried out in organizational conditions within the gymnastics section of the Dynamo Sports School Club in Bucharest. Through this study we aim to highlight the dynamics of jumping learning the handstand jump to the junior gymnasts level III, level 1 (9 years).

The study included a single experimental group consisting of 6 beginner gymnasts aged 7-9 years selected from the group.

Stages of the study:

Initial stage 15-30.IX.2017 - initial testing of control samples applied to physical and technical training;

Fundamental stage October, 2017 – May, 2018 - implementation of the training program.

Final stage May 1-12, 2018 - final testing of control samples applied to physical and technical training.

Research methods used: bibliography of the specialized literature; pedagogical observation - monitoring the evolution of gymnasts throughout the study; the experimental study - allowed verifying the proposed hypothesis; the statistical-mathematical method.

Control samples used:

a) Physical training:

- *speed running 12m* standing start, appreciated in sec. from 2 attempts;

- *the force of the back,* lying forward on the gymnastic box, with the legs hanging at one of the ends, raising the legs in the extension. Appreciation: total number of correct executions. Executions that go beyond the horizontal level are considered to be correct;

- *the force of the scapular-humeral belt, back and abdomen:* facial lying down, maintaining the position. Appreciation: secondary correct maintaining number. The position in which the back is in a straight position (without extension), the arms and legs stretched are considered correctly.

- *the force of the legs, standing long jumping - cm,* appreciated from 2 attempts, noting the best jump;

- *detente (explosive force)standing vertically jumping - cm,* appreciated from 3 attempts, scoring the best jump;

- *Force of legs:* Standing, squat jumping, simultaneously with rising the arms up. Appreciated the correct number of executions. Jumping with the stretched out legs is considered correct.

b) Technical training:

- sitting on the box: straight jump and landing on the ground in a fixed point, appreciated by scores from 1-10 pts;

- sitting on a box top, appreciated by scores from 1-10 pts, regarding the correctness of the execution:

Straight jumping with 360° turn to the left and landing;

Straight jump with 360° turn to the right and landing.

- take-off, jump on the trampoline, handstand jump and landing on the back on the cubes (mattresses), appreciated by scores from 1-10 pct.

Fig. 1. Improving jumping with hand stand tumbling with dorsal landing on overlapping blocks (classification schedule requirement, FRG, 2017)

The methodical learning sequence:

- trampoline jumps with swinging the arms;
- 3-5 steps of take-off jump on the trampoline and straight jumping on a gymnastic top box;
- 5-7 steps of take-off jump on the trampoline, tumbling jump on overlapping mats, extension jump and landing;
- Straight jumps as the ball on the carpet 5-10x;
- Straight jumps by rotating the arms from backward to forward 6-8x up;
- 3 straight jumps with arm rotation and straight jump on a 3-6x top of box;
- 3-5 running steps, jump on the trampoline, straight jump on the top cover, extension jump and 3-5x landing;

- 3 straight jumps with rotating the arms and the forward squat tumbling jump on the mattresses overlapped before the trampoline - 3-6x;
- 5-7 running steps, jump on the trampoline, forward squat tumbling jump, jump in extension and 6-8x landing.
- 5-7 running steps, jump on the trampoline, squat jump on vault table and jump in extension - 4-6x landing.
- 5-7 running steps, jump on the trampoline, handstand tumbling jump and falling with the body lying dorsally on overlapping blocks, up to the table level (with and without help).
- Full insurance jump
- Jumping without help

Research results

In female artistic gymnastics, compared with other apparatus, it has a low number of jumping with support. Most gymnasts try to learn more jumps from different groups. What we see in large-scale contests is the result of work that has been hidden over the years. Moving to the new apparatus, the jumping table, possibilities of making more difficulty jumps significantly increased. This involves a new training methodology [2, 5, 7, 14, 18].

Table 1. The results of physical training (n=6)

No. crit.	Name of sample	Statistical indicators							
		X		S		Cv		t	P
		Initial	Final	Initial	Final	Initial	Final		
1	Speed running 15 m (sec)	7,95	7,50	0,21	0,21	2,73	2,79	5,581	<0,01
2	Lifting legs in extension (no of reps)	14,2	17,2	1,72	2,64	12,16	15,37	3,222	<0,05
3	Maintaining the position standing lying face down (sec)	36,5	62,5	5,46	14,6	14,98	23,35	5,453	<0,01
4	Standing long jumping (cm)	117,2	120,0	7,16	7,79	6,12	6,49	7,058	<0,001
5	Standing vertical jumping (cm)	10,0	12,3	1,41	1,86	14,14	15,09	11,067	<0,001
6	Jump squats (no. reps)	11,7	14,17	1,37	2,136	11,7	15,08	3,726	<0,05

The results of the statistical and mathematical calculations of the control samples regarding evaluation of the physical training level of the gymnasts under study reveal the following (Table 1):

The speed running 15 m, appreciated in sec., arithmetic results are 8.01 sec. in initial testing and a decrease (improvement) with 0.44 sec. in final testing, with a high homogeneity in both tests. Regarding the average differences between the tests within the group, the obtained results in t = 5,581 are higher than those in the table and then the null hypothesis is rejected, i.e. there are significant differences between the tests in p<0,01.

The force of the back, appreciated by lifting legs in extension, the arithmetic results are 14.2 reps values in the initial test, and an increase with 3.0 repetitions in the final test, with a high homogeneity in initial and moderate end-to-end testing. Regarding the differences between the tests within the group, the results obtained in t = 3,223 are higher than those in the table and then the null hypothesis is rejected, i.e. there are significant differences between the tests in p<0,05.

The force of the scapular-humeral belt, the back, the abdomen, appreciated by maintaining the position of the standing lying face down in sec, the results of arithmetic mean are 36.5 sec in initial testing and an

increase of 26.0 sec in final testing, with a moderate homogeneity in initial and poor in final testing. Regarding the differences between the tests within the group, the results obtained in t = 5,453 are higher than those in the table and then the null hypothesis is rejected, i.e. there are significant differences between the tests in p<0,01.

The force of the legs, appreciated by standing long jumping-cm, results of arithmetic mean are values of 117.2 cm in the initial test and an increase of 2.8 cm in the final test, having a high homogeneity in both tests. Regarding the differences between the tests within the group, the results obtained in R = 0.98 and t = 7.058 are higher than those in the table and then the null hypothesis is rejected, i.e. we have significant differences between the tests in p <0.001.

Detente, appreciated by standing vertical jump-cm, results of arithmetic mean are values of 10.0 cm in the initial test and increase by 2.33 cm in the final test, having moderate limit homogeneity. Regarding the differences between the tests within the group, the results obtained in t = 11,067 are higher than those in the table and then the null hypothesis is rejected, i.e. there are significant differences between the tests in p <0,001

The force of the legs, appreciated by jump squatting - no. of reps., the results of arithmetic mean show values of 11.67 reps. in the initial test and an increase of 2.5 repetitions in the final test, with more homogeneity in both tests. Regarding the differences between the tests within the group, the results obtained in t = 3,727 are higher than those in the table and then the null hypothesis is rejected, i.e. there are significant differences between the tests in p <0,05.

Table 2 shows the results of technical training in standing jumping, on jumping learning with handstand tumbling of 7-9 year-old gymnasts.

Table 2. Results of technical training (n = 6)

No. crit.	Name of sample	Statistical indicators							
		X		S		Cv		t	P
		Initial	Final	Initial	Final	Initial	Final		
1	Straight jump and fixed point landing (points)	6,67	8,17	1,03	1,47	15,49	18,02	6,708	<0,01
2	Straight jumping with 360 ° turn to the left and landing (points)	5,67	7,67	0,81	0,81	14,41	10,64	7,745	<0,001
3	Straight jumping with 360 ° turn to the right and landing (points)	6,67	8,17	0,81	1,37	12,24	14,31	4,391	<0,01
4	Take-off, jump, hand stand jumping and landing on cubes(points)	6,367	8,67	0,82	1,03	12,24	11,91	7,746	<0,001

The results of the statistical and mathematical calculations of the control samples regarding the evaluation of the technical training level of the gymnasts under study highlight the following (Table 2):

Right jump and fixed point landing, appreciated by scores, the results of arithmetic mean show values of 6.67 points in the initial test and a 1.5 points increase in final testing, having a high homogeneity in initial and moderate end - to - end testing. Regarding the correlation between the tests, the results obtained in R = 0,95 and t = 6,708 are higher than those in the table and then the null hypothesis is rejected, i.e. there are significant differences between the tests.

Straight jump with a turn of 360° to the left and landing, appreciated by scores, results of arithmetic mean show values of 5.67 point in initial testing and an increase of 1.00 point in

final testing, with a high homogeneity in both tests. Regarding the correlation between the tests, the results obtained in R = 0.58 and t = 7.745 are higher than those in the table in p <0.05 then the null hypothesis is not acceptable and the differences are significant.

Straight jump with a turn of 360° to the right and landing, appreciated by scores, the results of arithmetic mean are 6.67 point in initial testing and a 1.5 point increase in final testing, with high homogeneity in both tests. Regarding the correlation between the tests, the results obtained in R = 0.635 and t = 4.391 are higher than those in the table at p <0.05 then the null hypothesis is not accepted and the differences are significant.

Take-off, jump, jump squatting and landing, appreciated by scores, results of arithmetic mean are values of 6.67 pct in initial testing and an increase of 2.00 pct in final test, having a high homogeneity in initial and moderate testing in - the final. Regarding the correlation between the tests, the results obtained in R = 0.819 and t = 7.746 are higher than those in the table and then the null hypothesis is rejected, i.e. there are significant differences between the tests.

In order to highlight statistically the efficiency of the standing jumping learning at the level of the beginner gymnasts, the results of the control samples from physical training with the means of technical training, both from the final testing were correlated.

Table 3. The results of correlating the physical training samples with the means of technical training (n=6)

No. crit.	**Statistical indicators, R; T**	Speed running 12m – sec	Force of the back	Force of the scapular-humeral belt, back and abdomen sec.	Force of legs	Detente	Force of legs
1	Straight jump and fixed point landing (points)	0,90 4,67	0,98 11,67	0,93 5,59	0,45 1,12	0,61 1,71	0,97 9,47
2	Straight jumping with 360 ° turn to the left and landing (points)	0,63 1,79	0,69 2,12	0,69 2,12	0,51 1,32	0,79 2,84	0,74 2,47
3	Straight jumping with 360 ° turn to the right and landing (points)	0,77 2,68	0,81 3,12	0,78 2,76	0,31 0,74	0,61 1,71	0,87 3,87
4	Take-off, jump, hand stand jumping and landing on cubes(points	0,81 3,12	0,96 8,14	0,93 5,59	0,61 1,71	0,71 2,23	0,94 6,02

The correlation results show *insignificant* differences between the following means of technical training and control samples of physical training (Table 3):

- straight jump and landing with the force of the legs in standing long jump and detention;
- straight jump with the turn of 360° to left and landing has a mean correlation with physical training but insignificant differences in p> 0.05.
- take-off, jump, squatting on the table, and jump, landing showing average correlation and insignificant differences with the force of the legs in standing long jump and detente.

But a good correlation has a deep jump with a 360° turn to the right with the force of the back and the force of the legs in jump squats.

From the core results, the gymnast's spatial-temporal orientation is better in the right direction, and from the physical training samples with jump squats closer to the landing effort features.

Conclusions

1. A poor physical training of children leads to a wrong, faulty technique and therefore fails in the contest. Also, good technical training, based on good physical training, in the absence of adequate psychological training, has the effect of modest performance.

2. The duration and level of landing is influenced by: *the complexity of the movement, the gymnasts' training level, the material base (*helper apparatus*), the professional capacity of the coach, etc.*

3. For the success of the learning process and prevent the occurrence of errors the teacher (coach) must have expert knowledge on movement technique and its implementation and developing the requisite stages of learning, specifically (separately) chosen, according to the particularities of each gymnast in part.

4. Average correlation results between tests and between means emphasizes that learning the standing jumping landing of 9 year-old junior gymnasts influence also the landing in other apparatus from the women' artistic gymnastics poliatlon.

At the end of the work we can say that knowledge of the structure of jump phases, the main requirements of execution and the relationship between the structural components, allow the correct sequencing of learning stages, selecting the most appropriate conditioning and helpful exercises, to detect easily mistakes causes as well as their means of remediation.

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