

SECTION – SPORT SCIENCES

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CONTROL IN THE PHYSICAL PREPARATION OF ATHLETES AGED 8-9 YEARS IN SPORT DANCING**Authors' contribution:**

- A. Study design/planning
- B. Data collection/entry
- C. Data analysis/statistics
- D. Data interpretation
- E. Preparation of manuscript
- F. Literature analysis/search
- G. Funds collection

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Abstract

Aim. The aim of the study was to control the physical fitness of dancers aged 8-9 at the stage of preliminary basic training in sport dancing.

Basic procedures. Theoretical analysis and generalization, pedagogical observation, testing and methods of mathematical statistics were. In the course of the study, 40 children aged 8-9 years, involved in dance sports groups were examined at the "Flamingo" dance sport club in Lviv. Physical fitness was evaluated through a set of 8 generally accepted tests determining the development level of flexibility, strength endurance and coordination skills. These particular qualities, according to the data of analysed authors and respondents, have the greatest impact on sport skills of young dancers in the phase of preliminary basic training [2, 6, 8].

Results. Analysis of data shows that there are significant group differences in all of the studied indicators between children aged 8-9 years.

Main findings. Particular qualities, according to the data analysed by authors, have the greatest impact on the sport skills of young dancers in the phase of basic preliminary training [2, 6, 8]. The level of indicators regarding many qualities of development, studied in the ascertaining experiment, were characterized by significant group variation ($V = 32.0-56.3\%$) indicating the absence of a specific technique aimed at developing and improving the physical fitness of dancers aged 8-9 years.

Conclusions. 1. Assessing the physical fitness preparation of athletes makes it possible to judge and evaluate stage level of the current period and determine the leading factors by which that level was achieved. 2. The indicators of lumbar spine mobility during bending, static strength of the shoulder muscles and back muscle strength endurance were at a satisfactory level. At the same time, the indicators of lumbar spine mobility during extension, hip joint mobility, abdominal muscle strength endurance, static balance, orientation ability and dynamic balance, and vestibular tolerance are not sufficiently developed and require improvement.

Introduction

Particular qualities, according to the data analysed by authors, have the greatest impact on the sport skills of young dancers in the phase of basic preliminary training. The lack of control and specifically purposeful development of physical fitness qualities causes a significant difference between indicators of physical readiness among

young dancers. According to the authors' data, flexibility, strength endurance and coordination abilities were selected as the main physical fitness qualities. Also, based on factor analysis, evaluation systems of young dancers' physical fitness level were developed.

The aim of the study was to control the physical fitness of dancers aged 8-9 at the stage of preliminary basic training in sport dancing, while the subject of the

study regarded evaluation of the physical fitness level of dancers aged 8-9 at the stage of basic preliminary training in sport dancing. Relevance of the topic concerned scientifically-based monitoring system of athletes' readiness is one way of improving the methodology of athletes' training process. This system is a base for effective development of the training process at all stages of long-term training [1, 4, 7, 8]. In order to create an efficient and effective training process, trainers should pay special attention to indicators of athletes' physical fitness, especially at the stage of basic preliminary training, since the "Juniors 1" category (8-9 years old) is the first one taking part in dance sport competitions. Due to the fact that dance sport has not clearly defined the control criteria until now, as well as the evaluation of the skill level of dance couples at competitions which is really subjectively comparative, it becomes necessary to find and develop informative criteria to control physical preparation of young dancers. Training types, content and structure of sport dance practice during long-term training normally varies according to age characteristics and technical improvement of dance couples [4, 7, 9]. When speaking about the training process in Ukrainian dance clubs, it is easy to notice that it has different approaches, methodology and evaluation of its effectiveness. According to the data of authorities, the level of physical fitness in sport dance may increase only by optimal development of basic technical skills, as through the early stages of long-term training well preparing a physical fitness base of athletes have a positive effect on the improvement of other components of the training system [1, 4, 8]. Analysis of scientific and methodological literature has revealed a lack of scientific materials devoted to the improvement and control of the physical fitness of dancers [1, 9]. Physical training as one of the main components of the training process among dance couples has not received sufficient consideration in scientific and methodological research. By some dance sport specialists, it is supposed that in the process of intensive technical training, it is possible to develop an appropriate level of motor skills and to form an optimal level of physical fitness readiness of athletes, which would allow successful implementation of competitive activities [3, 7, 8]. Such an approach may provide stabilization of the performance technique in competing compositions; however, it cannot be an effective remedy for improving the physical fitness of athletes. Necessary-rational organization of physical fitness control among athletes at the stage of basic preliminary training should be able not only to assess the level and dynamics of athletic skill, but also to plan the training process and correct it during that time, when necessary [1, 4, 9]. One of the aspects of solving this problem may be the assessment of young dancers'

physical preparation of, which, in turn, may become a basis for improving the training process at the stage of basic preliminary training in this sport.

Research methods and organization

The object of the study was physical fitness training of athletes/dancers aged 8-9 in sport dances.

Theoretical analysis and generalization, pedagogical observation, testing, methods of mathematical statistics were applied. In the course of the study, 40 children aged 8-9 years, involved in dance sports groups were examined at the "Flamingo" dance sport club in Lviv. The applied tests were in accordance with the requirements of sports metrology. Physical fitness was evaluated via set of 8 generally accepted tests that determined the development level of plasticity, strength endurance and coordination skills. These particular qualities, according to the analysed data, have the greatest impact on the sport skills of young dancers in the phase of basic preliminary training [2, 6, 8]. In the course of the study, the following indicators were determined: static and dynamic balance, vestibular tolerance, abdominal strength endurance, back muscle and upper shoulder strength endurance, lumbar-spine mobility and mobility of the hip joints.

Results of research and their discussion

The analysis of data shows that there are significant differences between group in all of the studied indicators for children aged 8-9 years. The coefficient of variation (V) ranged from 13-39%. The obtained data allows asserting that the lack of control and purposeful development of physical qualities leads to significant differences in the indicators of physical readiness of young dancers. However, it should be noted that all the indicators had a strong and average statistically significant relationship with the technical readiness of young dancers ($r = 0.52$ to 0.75 ; $p < 0.05$). As a result of factor analysis regarding the indicators of sports preparation among young dancers, the following physical qualities have been highlighted as priorities necessary for the achievement of high skills in sports dance: static and dynamic balance, vestibular tolerance, abdominal strength endurance, back muscle and upper shoulder strength endurance, lumbar-spine mobility during extension and mobility of the hip joints. During probability checking, a 5 levels significance level was chosen as a base, which provides a safe level for scientific research. The data obtained in the results were processed using mathematical statistical analyses [2, 6, 8]. According to the theory of grading standards and ratings, the following indices are low: $x - 2\sigma$ to $x - 1\sigma$; below-average - from x to $x - 1\sigma - 0,5\sigma$; average - from x to $x - 0,5\sigma + 0,5\sigma$; above-average - from x to $x + 0,5\sigma$

Table 1. Evaluation system of physical fitness among young dancers

Level		Passive mobility amplitude of hip joints (sm)	Lumbar-spine mobility during extension (sm)	Static balance (s)	Dynamic balance and orientation abilities (sm)	Vestibular tolerance (s)	Strength endurance of shoulder muscles (s)	Determination of abdominal strength endurance (times)	Static strength endurance of back muscles (s)
low	min	30.8	90.7	4.1	40.4	9.0	7.0	1	8.0
	max	25.2	81.2	9.7	34.0	25.0	13.2	2	16.7
below average	min	25.2	81.2	9.7	34.0	25.0	13.2	2	16.7
	max	22.4	76.4	12.4	30.7	33.0	16.3	3	21.1
average	min	22.4	76.4	12.4	30.7	33.0	16.3	3	21.1
	max	16.8	66.9	18.0	24.3	49.0	22.5	4	29.9
above average	min	16.8	66.9	18.0	24.3	49.0	22.5	4	29.9
	max	14.0	62.2	20.8	21.0	57.0	25.6	5	34.3
high	min	14.0	62.1	20.8	21.0	57.1	25.6	5	34.3
	max	8.4	52.7	26.3	14.6	73.1	31.8	6	43.0

+ 1 σ ; high - from x to $x + 1\sigma + 2\sigma$. With the above scale of grading norms, we can perform assessment of physical fitness among young dancers aged 8-9 years (Table 1).

Based on analysis of the data concerning the physical preparation of children aged 8-9 years, we can assert that the average indicator of hip joint mobility in the group was 19.6 ± 5.6 sm. The group with below-average values (25.2-22.4sm) included 4 children (10.0%); average (22.4-16.8sm), this indicator was observed in 18 dancers, which is 45.0%; above-average level (16.8-14.0sm) was recorded in 4 children (10.0%) and high (14.0-8.4sm) was observed in 7 dancers (17.5% of children) (Table 1). The majority of children aged 8-9 who participated in the study showed that the development of hip joint mobility was at an average level (45.0%), which indicates a satisfactory level of development of this indicator among young dancers.

Based on the results of research, the group with a low level of lumbar spine mobility during extension (90.7-81.2sm) included 6 dancers, representing 15.0% of the total; the group below-average (81.2-76.4sm) also included 6 children (15.0%); the average level (76.4-66.9sm) was observed in 14 dancers, which is 35.0%; above-average level (66.9-62.2sm) was recorded in 6 children (15.0%) and high level (62.1-52.7sm) was observed in 8 dancers (20.0% of all children) (Table 1). It should be noted that according to many authors, compared to boys, girls have better developed mobility of the

spine in extension at this age because of their natural flexibility [1, 7]. According to scientific literature, evaluation criteria of flexibility for girls are one level higher than boys. We can also note that young dancers are not aware of the importance of developing flexibility in order to achieve professional improvement and do not pay enough attention to it. Probably, one of the reasons is painful feelings during muscle stretching exercises, the other - lack of control over the development of flexibility in the process of sports training.

Within the group of children aged 8-9 years, the average indicator of static balance was 15.2 ± 5.6 s. Analysis of the test results, which consisted in determining the time standing on one leg, a low level of static balance (4.1-9.7s) was defined for 7 dancers, 17.5% of the total; the group with below-average (9.7-12.4s) included 6 dancers, showing 15.0%; average (12.4-18.0s) balance was observed in 14 dancers (35.0%); above-average level (18.0-20.8s) was demonstrated 6 children (15.0%); high level (20.8-26.3s) was observed in 7 children, 17.5% of the total number of dancers who participated in the study (Table 1). Despite the significant heterogeneity of the group, when we speak about this indicator, 35.0% of children showed an average level of static balance.

The average indicator of dynamic balance in the group was 27.5 ± 6.5 cm. The analysis of obtained data show that in the group with a low level of dynamic balance development (40.4-34.0 cm), there were 8 dancers, representing 20.0% of the total number of children; in the

group with a below-average level (34.0-30.7 cm), there were 10 dancers (25.0%); the average level of development to dynamic balance (30.7-24.3 cm) was observed in 12 dancers (30.0%); the level above the average (24.3-21.0 cm) was recorded by 6 children (15.0%); high level (21.0-14.6 cm) was observed only in 4 children (10.0%) (Table 1). Most of the children (75.0%) entered the middle, below-average and low level groups. At the same time, a high variation coefficient (V) of the current index indicates the group is heterogenous, and confirms the lack of purposeful work on the improvement of dynamic balance and the control of its level.

As a result of the study, the average balance recovery time after rotation made up 41.0 ± 16.0 s. In the group with a low level of vestibular tolerance development (9.0-25.0 sec), there were 6 dancers, which is 15.0% of the total number of children; the group with below-average level (25.0-33.0 s) included 8 dancers (20.0%); the average level (33.0-49.0 s) showed 14 dancers (35.0%); above-average level (49.0-57.0 s) was recorded in 4 children (10.0%) and a high level (57.1-73.1 s) was showed by 8 dancers (20.0%) of the total number of children who participated in the study (Table 1). Despite significant heterogeneity of the group, when we speak about this indicator, 35.0% of children showed an average level of vestibular tolerance. At the same time, a significant number of children (35.0%) were fixed with a low and below-average level of the current indicator, which confirms the need for further improvement of the vestibular tolerance of young dancers in the process of sports training.

It should be noted that indicators of strength endurance do not display any gender-related differences [2, 3, 6]. The test comprised of lifting and holding dumbbells weighing 1.0 kg while standing with arms to the sides allowed evaluating shoulder muscle strength endurance. The results of this test averaged 19.4 ± 6.2 s. 4 dancers belonged to the group with low level of strength endurance of shoulder muscles (7.0-13.2s), showing 10.0% of the total; the below-average group (13.2-16.3s) contains 10 children, which is 25.0%; the average level (16.3-22.5s) was observed in 15 dancers (37.5%); above-average (22.5-25.6s) in 5 children (12.5%) and high (25.6-31.8s) was observed in 6 dancers (15.0% of the total number of children who participated in the study) (Table 1). Most of the children aged 8-9 had muscular strength endurance of the shoulder of average level (37.5%) and below the average (25.0%), which indicates an insufficient and poor level of developing this quality among young dancers.

According to many authors, compared to girls, at this age, boys have better developed strength endurance of abdominal muscles [4, 6, 9]. According to the scientific literature, evaluation criteria of abdominal strength endurance of boys are one level higher than

girls. The results of the exercise comprised of lifting straight legs to an angle of 90° , we can say that 7 dancers fell into the group with a low level of abdominal strength endurance (1-2 times), showing 17.5% of children; the group with below-average (2-3 times) included 20 dancers, which is 50%; the average level of this quality (3-4 times) was observed in 8 dancers, representing 20%; above-average level (4-5) included 3 children (7.5%) and high level (5-6) was observed only in 2 dancers, representing 5% of the total number of dancers who participated in study (Table 1). The average indicator of abdominal muscle strength endurance for young dancers within the group was 2.8 ± 1.2 times. Assuming that the coefficient of variation is 42.9% in this case, we can state heterogeneity of this indicator within the group. This allows us to assert the lack of intentional development of abdominal muscle strength endurance of dancers aged 8-9 years.

According to the authors' data, indicators of strength endurance of the back muscles for children aged 8-9 years have no gender differences; this fact found reflection on the evaluation of indicators according to the developed scale [4, 6]. The average index of static strength endurance of the back muscle group was 25.5 ± 8.8 s. Analysis of the results regarding the performed test - performing a trunk lift to a 30° angle starting from face-down position, and trying to maintain in this stance as long as possible are the following: low level of static strength endurance of back muscles (8.0-16.7s) by 6 dancers, which is 15.0% of the total; the below-average group (16.7-21.1s) included 8 children, and is 20.0%; average level (21.1-29.9s) of this exercise was observed in 12 dancers (30.0%); above-average level (29.9-34.3s) was present in 8 children (20.0%) and high (34.3-43.0s) in 6 dancers (15.0% of the total number of children who participated in the study) (Table 1). Most of the children aged 8-9 years had an average level (30.0%) of muscular strength endurance development and did not stand out with significant intergroup deviations.

Discussion

In the course of this study, other authors' data concerning the importance of physical fitness of young athletes during preliminary basic preparation was well supplemented. During analysis of scientific technical literature, pedagogical observations, questioner of leading specialists in dance sport, information was received about the importance of physical fitness among athletes aged 8-9 years at all stages of the multi-sports training and the results were not significantly different from those in other high coordinated sports obtained by other researchers [3, 8, 9]. Thus, the results achieved by several authors regarding the importance of con-

trolling individual indicators of physical fitness of athletes who are engaged in high-coordinated sports were confirmed. According to the data obtained by several authors, basic physical properties influencing the skill level of dancers are: coordination abilities, flexibility and strength indicators [1, 4, 5]. In the course of this study, a specific series of physical qualities has been determined, which according to sport dance experts, limit the process of achieving high sports mastery in this sport. However, scientific and methodological literature does not identify the level of leading physical qualities that should be possessed by athletes during previous basic preparation for successful competitive activity. In addition, ways to evaluate the development level of these indicators are also not identified. The obtained results of the study allowed improving the general pattern that serves as the basis of the physical development, physical preparedness of young dancers at the stage of basic preliminary training. Scientific information about the leading role of physical fitness in the overall structure of athletes' development at the stage of basic preliminary training in dance sport was well supplemented. In the course of the study, we confirmed the scientific data of G. P. Artemyeva [1] about the content and methodology of physical training among young dancers; T. Osadtsiv's [5] data about the need physical fitness improvement of athletes at the stage of basic preliminary training in sports dances and results about the importance of all components of physical fitness in young dancers and their combination and organization at the stage of basic preliminary training.

Conclusions.

1. In the course of the study, it was found that assessing the physical fitness preparation of athletes makes it possible to judge and evaluate the current period at a stage level and determine the leading factors by which that level was achieved. It is needed to compare the levels of readiness of each athlete and outline the main directions for further improvement.
2. In the course of our research on physical fitness level of young dancers at the stage of basic preliminary training, we found that the indicators of lumbar spine mobility during bending, static strength of shoulder muscles and back muscle strength endurance, were at a satisfactory level. At the same time, the indicators of lumbar spine mobility during extension, hip joint mobility, abdominal muscle strength endurance, static balance, orientation ability, dynamic balance, and vestibular tolerance are not sufficiently developed and need improvement. The level of indicators regarding the development of many qualities, studied in the ascertaining experiment, were characterized by significant group variation ($V = 32.0-56.3\%$), indicating the absence of a specific technique aimed at developing and improving physical fitness of dancers aged 8-9 years.

Further perspectives and recommendations. Future improvement of the system concerning physical training of young dancers is possible by applying controlling processes above the level of the basic physical qualities and their purposeful development at subsequent stages of sports training.

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