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The contribution of dance elements to the physical development of primary school children

Annotation

Nowadays children, during recent years, have increasingly faced problems of hypertension, muscle imbalance, posture disorders. Incorrect body position, creates unfavourable conditions for the functioning of organs and systems. One of the ways to improve violations are the means and methods of physical education and sports applications.

Based on the theoretical and practical data of the research, it was assumed that organizing dance training with the inclusion of gymnastic exercises in the regimen three times a week will result in improving the physical abilities of the examinees.

The pedagogical experiment involved 69 children from two primary grades.

The results of the research demonstrated the effectiveness of the experimental methodology of physical development with the use of dance and gymnastics means aimed at the prevention of muscle imbalance in children of primary school age.

Key words: children of primary school, physical development, dance.

Volume 8 Issue 2 - 2025

Polyakova Varvara, Aftimichuk Olga
Institute of Physical Education and Sports of the State University of Moldova, Moldova

Correspondence: Polyakova Varvara, Institute of Physical Education and Sports of the State University of Moldova, Chisinau, Moldova, Tel. +37368530191
Aftimichuk Olga, Institute of Physical Education and Sports of the State University of Moldova, Chisinau, Moldova, Tel. +37369143789

Received: August 07, 2025 | **Published:** August 20, 2025

Introduction

Currently, under the influence of numerous socio-economic and environmental factors, the health of children and adolescents has deteriorated and is in critical condition. For children in primary school, school education is associated with a decrease in physical activity, an increase in psycho-emotional and intellectual stress, which can pose a natural threat to the emergence of morpho-functional distortions in their development.[1–3] Incorrect posture, according to many authors, is found in 15-20% of children of younger age, and by 10-12 years old – it is noted in every third child.[4,5] The vast majority of postural disorders in school-age children have acquired a functional character. It is known that the conditions of the educational environment are the dominant factor in the formation of a whole range of functional states of students that reflect a type of syndrome of "school violations" in the activities of the life support systems of the body.[6] The high level of tension and intensity of the educational process, the extreme limitation of time for assimilation of the necessary information worsen the psycho-functional state of the child.[7] In addition, in the conditions of the scientific and technological revolution (smartphones, tablets) has sharply increased children's interest in knowing these "toys", which often leads to an increase in neuro-psychic load, significantly reduces the physical activity of children. At the same time, in combination with sleep disorders and decreased motor activity, these factors have a stressful effect on the developing organism.[8] Lack of movement and static positions lead to asymmetry in muscle development and ultimately to various posture disorders.

Nowadays children, during recent years, have increasingly faced problems of hypertension, functional disorders of the muscles, muscle imbalance, when some muscle groups are spasmed, and others, on the contrary, too relaxed, which can lead to muscle fatigue, muscle pain, posture disorders. Incorrect body position, which is related to the need to prolong the saving of the working position, unilateral muscle weight, weakness and underdevelopment of the musculoskeletal system, decreased vision, hearing, creates unfavourable conditions for the functioning of organs and systems.[9–11] Adverse effects occur, in particular, in the circulatory, respiratory, digestive systems. The position of body segments in space with forced static hypostases sitting, standing, conditioned reflex is fixed in a habitual position, a posture is established, curves of the spine are formed. Training, education, and then strengthening is done at 18-20 years old. One of the ways to improve violations are the means and methods of physical education and sports applications.[12,13] The implementation of these tools and techniques creates the conditions for the formation of correct posture, its correction and prevention of disorders in the process of targeted physical development.

Research purpose and methodology

The purpose of the research is to establish the arsenal of dance tools for the physical development of young school-age children in order to prevent muscle imbalance.

Based on the theoretical and practical data of the research, it was assumed that organizing dance training with the inclusion of gymnastic exercises in the regimen three times a week will result in improving the physical abilities of the examinees.

The pedagogical experiment involved 69 children from two primary grades. The experimental group consisted of 36 second-grade students specializing in Choreography, and the control group – 33 second-grade students specializing in Choral Art.

The pedagogical experiment was carried out in two basic stages.

At *the first stage*, were solved the objectives of systematizing dance and gymnastics means, which ensure the development of physical abilities in the examined children. At the current stage, the parameters of physical abilities were established. The initial level of development of the examined was assessed using methods of testing physical abilities. All tests were divided into three groups: strength, flexibility, speed abilities.

At *the second stage*, the monitored effectiveness of the experimental program for the development of physical abilities of the examined children was carried out.

Experimental methodology

Physical development is a set of morphological and functional characteristics of an organism in their interconnection and dependence on environmental conditions that characterize the maturation process at any given time.

A healthy spine, correct posture, a well-formed chest, as well as symmetrically and sufficiently developed muscles are not only the basis of a beautiful and slim figure, but also a guarantee of physical health, and often social and psychological well-being. Unfortunately, today the percentage of school-age children with various types of posture disorders, scoliosis and flat feet is quite high. Often, at the initial stage of changes in the musculoskeletal system, many underestimate them. However, against the background of this, as many people believe, "a harmless defect" serious diseases develop, such as scoliosis, osteochondrosis, vegetative-vascular dystonia, various activity disorders, and then diseases of internal organs that are difficult to treat and can "poison" the rest of life.

The presence of impaired posture, scoliosis in schoolchildren is often reflected in their academic performance. Such children get tired faster, cannot afford static muscle tension during lessons and, therefore, are more often distracted, which leads to inattention, memory impairment, poor assimilation of the material and, as a result, academic failure. Such children constantly receive comments in the lesson, indicating restlessness and violation of discipline. Very often, poor posture is combined with visual impairments.

Taking into account the above, we have developed a methodology for the physical development of primary school students aimed at the prevention of muscle imbalance for the formation of correct posture in children of younger school age.

The experimental methodology involved the use of dance and gymnastics equipment. The lessons were held three times a week for a duration of 90 minutes and consisted of three main parts.

The preparatory part of the lesson (25-30 minutes) included a full warm-up of the body and all muscles. The specific objectives included the formation of correct posture and a beautiful walking.

This period of time of the lesson includes different variants of walking (gymnastic, soft, on tiptoes, arched, high, lunge), running (light, rhythmic with a change of direction by a conditioned signal, with raising the thighs, with legs outstretched); jumping (jumping steps, galloping steps in different directions). The peculiarity of the jumps includes the combination of work of the legs and arms, which involves the tension of some muscles and the relaxation of other muscles of the whole body. Turns on two legs were used: by stepping, crossed, and one leg: with different positions of the free leg.

Further on, the preparatory part was carried out choreographic exercises near the support bar, which included: demi-plié, grand-plié with different hand movements in accordance with waves, lunges, applications; different variants of battement tendu; variants of battement tendu jeté; variations of rond de jambe par terre with waves, butterflies, applications, lunges; variations of battement fondu and battement frappé; rond de jambe en l'air; développer; slow releve in accordance with balances, applications, turns; stretching exercises; grand battement jeté in accordance with turns, jumps, balances; small jumps.

In the middle of the hall, the following exercises were performed: arm swing – for arms and body; exercises with body waves, various applications and inclinations; balance exercises; tours lents, various turns; small choreographic jumps: temps leve, changement de pieds, pas echappe, jete, etc.; large gymnastic jumps in place (straight, straight with turn, with extension).

At the end of the preparatory part, acrobatic elements were performed: "rope" (in the sagittal and frontal planes), "fish", "basket", "bridge", "wheel".

All the exercises performed were performed with musical accompaniment with all types of tempo: slow, moderate, fast. The music was carefully selected in accordance with the age and interests of the children.

Within the pedagogical experiment in the preparatory part of the lesson, the maximum time was given to choreographic training. Alternating the diverse work of the body, arms and legs helped to achieve the necessary result. The exercises were selected in such a way that all muscle groups were involved in the work, which is very important for the formation of correct posture in children.

The basic part of the lesson lasts 40-45 minutes and is aimed at learning and perfecting the basic compositional elements that make up the entire dance in accordance with the compositional theme. This part of the lesson includes the development and learning of dance compositions, both through the process of organizing children in groups and frontally. The correct technique for performing dance exercises involved maintaining a straight posture. Failure to comply with this rule distorted both the specific movement and the composition as a whole.

It was used the music which contains dance compositions for the competition. Children learn to coordinate movements with music, as well as to express the character of the musical work through body plasticity.

The final part lasts 10-15 minutes and is represented by strength exercises for large muscles (abdominal and back) and deep stretches. At the end of the part, dynamic rhythmic-musical games were played.

Results of the study and discussions

To assess the effectiveness of the experimental methodology, testing of the physical qualities of the researched subjects was carried out. The testing included twelve parameters of physical capacities, chosen in three groups: muscle endurance (6 parameters), flexibility (4 parameters), speed (2 parameters). Table 1 presents the results of the dynamics of the development of physical qualities in the experimental group.

The results from the block of the category of endurance strength explain that out of 6 parameters, one, the muscles of the parts of the trunk – right, is significant on the threshold $\rho < 0.001$; the four parameters are significant on the threshold $\rho < 0.01$: the strength of the muscles of the parts of the trunk – left, abdominal muscles, back arms; and a parameter, the resistance force of the leg muscles, – on the threshold $\rho < 0.05$.

The obtained results demonstrate the rather high potential of dance and gymnastics means, oriented to the development of strength capacities.

To confirm the flexibility parameters, we investigated the dynamics of the development of the hip and spine joints. Out of the 4 parameters, the following two: the front hip and spine flexibility and the spine are significant on the threshold $\rho < 0.001$; and the two parameters, the right hip and left hip flexibility – on the threshold $\rho < 0.01$. These data confirm the specificity of dance, in which elasticity capacities are preferred.

Citation: Varvara P, Olga A. The contribution of dance elements to the physical development of primary school children. *MOJ Sports Med.* 2025;8(2):58–61. DOI: 10.15406/mojsm.2025.08.00184

Table 1 Average group indices of the dynamics of physical capacity parameters of the experimental group

Parameters			$\overline{X} \pm m_{\bar{x}}$		**t**	ρ
			initial	**final**		
Muscle endurance	abdominals (times)		13.0±1.55	19.0±1.67	3.221	< 0.01
	back (sec)		16.7±1.25	22.0±1.57	3.21	< 0.01
	The parts of trunk (sec)	right	17.2±2.9	29.3±2.6	3.795	< 0.001
		left	16.95±2.95	28.9±2.9	3.534	< 0.01
	arms (m)		3.0±0.9	6.1±0.89	2.998	< 0.01
	legs (times)		23.9±1.5	28.3±1,4	2.622	< 0.05
Flexi-bility (cm)	coxal-femoral	right	20.79±0.93	16.89±0.87	3.746	< 0.01
		lefts	19.28±0.87	16.2±0.6	3.509	< 0.01
		frontal	18.13±0.84	15.01±0.41	3.885	< 0.001
	backbone		-5.3±0.85	1.5±0.73	4.139	< 0.001
Speed	actions (times)		10.4±1.32	15.3±1.54	4.218	< 0.001
	reaction (cm)		35.36±2.36	27.59±2.05	3.034	< 0.01

n = 36; f = 35 by ρ < 0.05, t = 2,028; ρ < 0.01, t = 2,719; ρ < 0.001, t = 3,582

In the group of speed parameters, one, the speed of actions, is significant on the threshold ρ < 0.001; another, the speed of reaction, is significant at the threshold ρ < 0.01. Dancing with a partner and in a group contributes to the development of these physical capacities.

In another case, we analyze the control group (Table 2). No parameter presented statistical significance at the threshold ρ < 0.001. Of the 12 parameters, four: the resistance force of the abdominal muscles, arms, legs and speed of actions are significant at the threshold ρ < 0.01. Three parameters: the flexibility of the right coxo-femoral, frontal and backbone, presented statistical significance at the threshold ρ < 0.05. And the data of five parameters are not significant (ρ > 0.5): the resistance force of the muscles of the back, the right side of the trunk, the left side of the trunk, the flexibility of the left coxo-femoral joint, and the reaction speed.

Table 2 Average group indices of the dynamics of physical capacity parameters of the control group

Parameters			$\overline{X} \pm m_{\bar{x}}$		t	ρ
			initial	final		
Muscle resistance force	abdominal (times)		13.8±1.7	20,0±1.9	3.003	< 0.01
	back (sec)		17.0±1.3	19.5±0.8	1.973	> 0.5
	part of the trunk (sec)	right	18.0±1.8	21.9±2.37	1.607	> 0.5
		left	17.86±1.8	21.5±2.0	1.673	> 0.5
	arms (m)		3.54±0.84	7.0±0.98	3.309	< 0.01
	legs (times)		22.59±1.4	29.0±1.8	3.453	< 0.01
Flexibility (cm)	coxo-femoral	right	20.75±0.89	18.95±0.4	2.145	< 0.05
		left	19.18±0.83	17.61±0.3	1.871	> 0.5
		frontal	18.21±0.85	16.3±0.42	2.368	< 0.05
	spine		-4.81±1.08	-2.17±0.86	2.352	< 0.05
Speed	actions (times)		11.5±0.93	15.1±1.02	3.226	< 0.01
	reactions (cm)		35.93±1.64	33.09±1.45	1.605	> 0.5

n = 33; f = 32 by ρ < 0.05, t = 2,036; ρ < 0.01, t = 2,738; ρ < 0.001, t = 3,621

In order to determine the effectiveness of the developed methodology, a comparative analysis of the final average group indices was performed in the experimental and control groups. The dynamics of the average group parameters examined are presented in Table 3.

As can be seen, out of 12 parameters, more than half (7) showed statistical significance, of which one, backbone flexibility, – on the threshold ρ < 0.01, six others – on the threshold ρ < 0.05. It should be noted that all parameters in the flexibility group are significant in favor of the experimental group, thereby determining the specificity of dance lessons.

It is worth noting that two parameters: the resistance force of the muscles of the trunk parts, are also significant (ρ < 0.05) which argues for educating during the lessons the sense of balance and correct posture, where skeletal muscles participate more.

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Table 3 Comparative analysis of the final average group indices of physical development in the experiment and control groups

Parameters			$\overline{X} \pm m_{\bar{x}}$ Group		t	ρ
			experimental	control		
Resistance force of the muscles	Abdominal (times)		19.0±1,67	20.0±1.9	0.395	> 0.5
	back (sec)		22.0±1,57	19.5±0.8	1.189	> 0.5
	part of the trunk (sec)	right side	29.3±2,6	21.9±2.37	2.103	< 0.05
		left side	28.9±2.9	21.5±2.0	2.294	< 0.05
	arms (m)		6.1±0.89	7.0±0.98	0.678	> 0.5
	legs (times)		28.3±1,4	29.0±1.8	0.307	> 0.5
Flexibility (cm)	coxo-femoral	right	16.89±0.87	18.95±0.4	2.15	< 0.05
		left	16.2±0.6	17.61±0.3	2.104	< 0.05
		frontal	15.01±0.41	16.3±0.42	2.198	< 0.05
	backbone		1.5±0.73	-2.17±0.86	3.254	< 0.01
Speed	actions (times)		15.3±1.54	15.1±1.02	0.108	> 0.5
	reaction (cm)		27.59±2.05	33.09±1.45	2.64	< 0.05

$n_1 = 36, n_2 = 33$ (f = 67) by $\rho < 0.05, t = 1,996$; $\rho < 0.01, t = 2,650$; $\rho < 0.001, t = 3,41$

The parameter "speed of reaction" ($\rho < 0.05$) is of interest, which confirms the work in pairs in dance lessons. Working in pairs develops a sense of partnership, motor and visual coordination, spatial orientation, vestibular stability. All of this is expressed through the speed of reaction to both the partner's actions and the actions of other dance couples.

Conclusions and recommendations

Thus, the results of the research demonstrated the effectiveness of the experimental methodology of physical development with the use of dance and gymnastics means aimed at the prevention of muscle imbalance in children of primary school age. In turn, this allows us to assert the effectiveness of dance lessons for the formation of a straight posture in children.

The methodology of conducting dance lessons with an emphasis on the prevention of muscle imbalance can be used in various activities developed not only with school-age children, but also with preschoolers and adults.

In our opinion, the developed methodology can be used in the content of professional training not only by dance teachers, but also by physical education teachers.

The use of music of various styles in dance lessons helps to enrich the teacher both from the point of view of growing his culture and that of his children, and from the point of view of a creative approach to his profession.

Acknowledgments

None.

Conflicts of interest

The author declares that there are no conflicts of interest.

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