

**STATE OF PHYSICAL DEVELOPMENT, MOTOR
PREPAREDNESS AND DYSFUNCTIONS OF THE
LOCOMOTOR'S APPARATUS OF PRIMARY CLASSES GIRLS
FROM THE RURAL AREAS OF THE REPUBLIC OF MOLDOVA**

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Key-words: village's primary school students, physical development, motor preparedness, vertebral column, orthopedic deficiencies, scoliosis, flat foot, obesity, locomotor system, physical exercises, physical therapy.

Abstract: The present article describes the experimental-analytical information about state of physical development, motor preparedness, the existence of negatives factors (scoliosis, flat foot and obesity) of village's primary school students (girls) of Republic of Moldova. This information will permit to know the situation and form a process of education and development in physical education, taking into account the state secondary school students in cities.

Nowadays, a very up-to-date topic is strengthening the resistance of human body in unfavorable social, economic and ecological environment, which contributes to the increase of labor and intellectual capacity, physical development, maintenance and reinforcement of health, which are possible only by planning specific motor skills.

To this end, a great importance is paid to motor development of the young generation, and namely of children who, if developing in a favorable environment, will reflect the state of their health and of the entire society. It should be mentioned here that the necessity of movement and intense motor activity are the most important biological characteristics of the body of a child. Reduced muscular activity does not only hamper the development of the body as a whole and damages health, but also leads to serious future consequences, such as the decrease of the capacity of assimilating knowledge and of acquiring essential motor skills.

A very important age stage in the development of children is the twelve-year school education, which contributes to the intense development of intellectual, psychic, psychological and motor-functional capacities which, as a whole, represent the level of instruction and health of school students. In this context, we can state that an important aspect at this age stage is also the motor development of children which, at its turn, improves the physiological and psychic functions of the body, encourages the physical growth and development, increases the level of intellectual capacities of school students [1;2;3]. Nevertheless, currently a great number of researchers have found that the instructional-educational process from the educational institutions is characterized by the increase of the volume and intensity of educational-cognitive activity which influences the reduction of the level, insufficient as it is, of the motor activity. Such an orientation and tendency in the development of a modern educational institution is in absolutely no correlation with the necessity of settling the issues of physical development of school students, from the viewpoint of sufficient neuromotor activity and appropriate physical development.

Moreover, the lack of appropriate conditions and non-execution of sufficient motor activities by children at home, in pre-school and pre-university institutions lead to the appearance of functional disorders of the muscular and locomotor systems, such as scoliosis and flat foot (platypodia), which practically cannot be cured along the life but can be prevented and stopped by practicing correctly selected motor activities. The presence of scoliosis and flat foot phenomenon, as well as the insufficient motor activity of healthy children leads to an inappropriate physical training, which at its turn generates disorders of the motor development, influencing in the same time the psychic aspect of the child and reduces his communication capacities, an important factor in the creation of school student's personality.

In the light of the above, we have organized and carried out a pedagogical research within the national project „Modern tendencies in the promotion of a healthy lifestyle, by means of prophylaxis and rehabilitation of locomotor system's disorders of school-age children, using physical development methods". The implementation of this project supposes the study of the level of physical development, of motor training and of negative factors in the motor development of school students from different districts of the Republic of Moldova, including

primary schools from Edinet, Chisinau, Stefan Voda, Causeni, Singerei districts and from Tataresti locality.

For investigating the physical development level and the motor training of school students and for detecting negative factors, we have applied an optimal number of tests, for various categories of children and school environments that would provide sufficient validity, credibility and transparency of the studied phenomena [4].

Types of conducted tests:

a) for the evaluation of the **physical development** of school students:

-height (cm);

-weight (kg);

b) for the evaluation of the **motor development** of school students:

- shuttle run 3x10m (sec);

- standing long jump (cm);

- bench push-ups (no.);

- sit-ups (hands on the chest) in 30 sec. (no.);

- forward bends on the bench (straight legs) (cm);

c) for determining **negative factors** of the physical development of school students:

-flat foot (platypodia) (%);

-scoliosis (%);

-obesity (%).

We would also like to mention that the results of physical development tests complexly reflected the motor state of school girls, according to force, force-speed abilities and coordination of body movements and elasticity. Hence, all tests had been conducted in accordance with the established methods, represented at full extent in the relevant literature and their results had been analytically – mathematically processed, emphasizing basic statistical characteristics from the entire selected data, which constituted the basics for an accurate comparative analysis in accordance to the Student's t-criterion. The obtained results allowed us to determine the level of physical development of school students and to analyze, using the comparative method, the preponderant regional difference of physical development between the northern, southern and central parts of Moldova.

Tables 1, 2, 3 represent the results, based on which can be determined the physical and motor state and the presence of negative factors at girls from primary classes from Tataresti, Singerei and Causeni districts. Thus, in table 1 had been presented statistical data of the investigation

performed on school girls according to their physical development (height, weight and their correlation with the Quetelet index, DE-diaphragmic excursion), as well as to their motor state, based on tests which reflect the development of basic physical qualities and the presence of negative factors: flat foot, scoliosis and obesity.

Table 1. *Statistical characteristics of investigation results over primary classes girls from rural educational institutions of the Republic of Moldova, according to their physical state, motor development and the existence of negative factors in their development.*

District centers (villages)	Tests									Flat foot %	Scoliosis %	Obesity %	Quetelet index (norm)%
	Height (cm)	Weight (kg)	Quetelet index	Shuttle run (sec)	Standing long jump (cm)	Sit-ups (no.) (hands on the chest) in	Push-ups (no.)	Diaphragmic excursion (cm)	Forward bends (straight)				
1 st class													
Tataresti	121,10± 2,10	23,50± 3,40	0,18±0 ,02	11,20± 0,20	78,45±6 ,47	15,80± 0,90	1,66±0 ,25	4,30±0 ,28	5,50±0 ,64	26, 66	6,6 6	6,66	93, 34
Singerei	129,87± 1,34	26,38± 0,96	0,20±0 ,005	9,18±0 ,13	111,13± 2,53	16,67± 0,89	1,03±0 ,11	3,53±0 ,23	5,93±0 ,97	26, 66	-	-	100 ,00
Causeni	127,20± 1,94	25,50± 1,23	0,19±0 ,006	9,17±0 ,13	114,90± 3,59	16,60± 1,23	1,20±0 ,14	4,60±0 ,30	3,60±1 ,44	6,6 6	-	-	100 ,00
\bar{X}	126,06± 1,79	25,13± 1,86	0,19±0 ,01	9,85±0 ,15	101,49± 4,20	16,36± 1,01	1,30±0 ,17	4,14±0 ,27	5,01±1 ,02	20, 00	2,2 2	6,66	93, 34
2 nd class													
Tataresti	114,30± 1,11	23,40± 1,24	0,19±0 ,007	9,50±0 ,29	99,40±3 ,72	15,50± 1,73	1,80±0 ,99	4,30±0 ,37	2,80±1 ,61	20, 00	13, 33	-	100 ,00
Singerei	132,80± 1,41	29,94± 0,92	0,23±0 ,005	9,31±0 ,15	113,07± 5,21	20,13± 0,82	1,33±0 ,52	3,93±0 ,15	6,60±0 ,17	40, 00	13, 33	-	100 ,00
Causeni	126,60± 4,74	24,60± 1,43	0,25±0 ,004	10,30± 0,06	118,30± 5,70	19,80± 1,11	1,30±0 ,38	4,55±0 ,28	9,60±1 ,53	-	-	-	100 ,00
\bar{X}	124,57± 2,42	25,98± 1,20	0,22±0 ,005	9,70±0 ,17	110,26± 4,88	18,48± 1,22	1,48±0 ,63	4,26±0 ,27	6,33±1 ,44	20, 00	8,8 9	-	100 ,00
3 rd class													
Tataresti	133,70± 2,23	29,50± 3,08	0,21±0 ,01	10,41± 0,28	118,50± 5,60	18,60± 0,75	2,71±0 ,36	4,14±0 ,42	5,50±0 ,32	20, 00	13, 33	6,66	93, 34
Singerei	130,90± 1,13	24,50± 1,47	0,18±0 ,008	11,83± 0,32	130,00± 4,84	15,16± 2,09	2,66±0 ,09	3,86±0 ,32	7,66±1 ,45	26, 66	13, 33	-	100 ,00
Causeni	131,00± 0,53	30,08± 0,35	0,22± 0,01	9,25±0 ,03	139,25± 3,90	18,50± 1,04	2,30±0 ,15	3,98±0 ,24	8,50±0 ,78	-	13, 33	-	100 ,00
\bar{X}	131,87± 1,50	27,96± 1,63	0,20±0 ,009	10,50± 0,21	129,25± 4,78	17,42± 1,29	2,56±0 ,20	3,99±0 ,33	7,15±0 ,855	15, 55	13, 33	6,66	93, 34
4 th class													
Tataresti	139,20± 6,90	30,70± 2,12	0,21±0 ,005	9,15±0 ,56	151,50± 8,15	20,00± 1,24	3,00±0 ,80	5,00±0 ,01	9,00±6 ,26	13, 33	6,6 6	-	100 ,00
Singerei	135,87± 1,49	29,00± 0,74	0,20±0 ,008	9,11±0 ,14	129,80± 4,61	16,00± 0,67	3,13±0 ,26	4,93±0 ,37	2,80±0 ,96	46, 66	20, 00	-	100 ,00
Causeni	139,10± 1,57	32,10± 1,34	0,24±0 ,006	8,60±0 ,13	151,10± 6,16	19,44± 1,34	3,50±0 ,68	4,96±0 ,25	10,00± 1,68	20, 00	6,6 6	-	100 ,00
\bar{X}	138,06± 3,32	30,60± 1,40	0,22±0 ,006	8,95±0 ,28	144,13± 6,31	18,48± 1,08	3,21±0 ,58	4,96±0 ,21	7,27± ±2,97	26, 66	11, 11	-	100 ,00
Average general indexes of girls from primary classes													

Tataresti	127,07± 3,08	26,77± 2,46	0,20±0 ,01	10,06± 0,33	111,96± 5,98	17,47± 1,15	2,29±0 ,60	4,433± 0,27	5,70±2 ,21	26, 66	10, 00	6,66	93, 34
Singerei	132,36± 1,34	27,45± 1,02	0,20±0 ,006	9,86±0 ,18	121,00± 4,30	16,99± 0,12	2,04±0 ,24	4,06±0 ,27	5,75±1 ,14	35, 00	11, 67	-	100 ,00
Causeni	130,97± 2,19	28,07± 1,09	0,22±0 ,06	9,33±0 ,09	130,89± 4,84	18,58± 1,18	2,07±0 ,34	4,52±0 ,27	7,92±1 ,36	13, 33	5,0 0	-	100 ,00
\bar{X}	130,13± 2,20	27,43± 1,52	0,21±0 ,007	9,75±0 ,20	121,28± 5,04	17,68± 1,15	2,13±0 ,39	4,34±0 ,27	6,46±1 ,57	25, 00	8,8 9	6,66	93, 34

Table 2 represents the comparative statistical analysis of the obtained results on the physical and motor state of the investigated girls from primary classes, representing in different colors the investigated districts and their real domination according to the studied indicators.

Table 2. Investigation results of physical and motor development and the presence of negative factors of the motor state of girls of primary classes from the educational institutions of the Republic of Moldova

N o.	Tests	Statistical characteristics $\bar{X} \pm m$			Comparative analysis						
		Tatares ti	Singerei	Causeni	1-2 Tataresti- Singerei		1-3 Tataresti- Causeni		2-3 Singerei- Causeni		
		1	2	3	t	P	t	P	t	P	
I	Physical										
	development										
1	Height (cm)	127,07± 3,08	132,36±1,3 4	130,97±2,1 9	1,57	>0,05	1,03	>0,05	0,54	>0,05	
2	Weight (kg)	26,77± 2,46	27,45±1,02	28,07±1,09	0,25	>0,05	0,48	>0,05	0,42	>0,05	
3	Diaphrag mic excursion (cm)	4,43± 0,27	4,06±0,27	4,52±0,27	0,97	>0,05	0,24	>0,05	1,21	>0,05	
4	Quetelet index	93,34	100,00	100,00	-	-	-	-	-	-	
II	Motor state										
1	Shuttle run 3x10m (sec)	10,06± 0,33	9,86±0,18	9,30±0,09	0,54	>0,05	2,15	<0,05	2,65	<0,01	
2	St. long jumps(c n)	111,96± 5,98	121,00±4,3 0	135,97±4,9 4	1,23	>0,05	2,46	<0,05	1,53	>0,05	
3	Bench push-ups (no.)	2,29± 0,60	2,04±0,24	2,90±0,78	0,38	>0,05	0,32	>0,05	0,07	>0,05	
4	Sit-ups (hands on the chest) in 30 sec. (no)	17,47± 1,15	16,99±1,12	19,51±1,59	0,30	>0,05	0,67	>0,05	0,97	>0,05	

5	Forward bends on the bench (hands down)(cm)	5,70± 2,21	5,75±1,14	2,27±1,30	0,02	>0,05	0,86	>0,05	1,22	>0,05
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Note: P – 0,05; 0,01; 0,001
t= 1,980; 2,618; 3,374

The results of the obtained statistical analysis show that from the physical development criteria, and namely according to height, weight and DE (diaphragmic excursion) indexes, girls from primary classes from Tataresti, Singerei and Causeni have basically a similar development (with $d > 0,05$). This fact is also available for Quetelet indexes which, according to the standard tests, is observed at the school girls from Singerei and Causeni districts (100%), followed with a slight difference by the primary classes girls from Tataresti district (93,34%).

Hence, according to the evaluation of physical development of primary classes girls from rural educational institutions of Tataresti, Singerei and Causeni districts, we have found that in the majority of cases the body and the physical state is being formed in accordance with age physiology and also under the influence of certain negative factors and the ecological environment.

The investigation of the motor state of girls of primary classes school from the above-mentioned localities showed that according to the majority of tests, indexes which characterize force, force-speed and body elasticity show a relatively identical development (unconfirmed) with $d > 0,05$ (Table 2). Exceptions are the „shuttle run” test results, which characterize speed and coordination possibilities of primary classes girls from the investigated districts, out of which the girls from Singerei and Causeni districts (relatively similar, with $d > 0,05$) prevail over their peers from Tataresti district, with $d < 0,05$. According to development level of force-speed abilities, the results of girls from Causeni district prevail over the results of their peers from Tataresti district, with $d < 0,05$. According to other results, characterizing other motor abilities of girls from primary classes, no regional differences had been recorded ($d > 0,05$).

Thus, we consider that the motor state of primary classes girls from rural educational institutions of the investigated districts corresponds to an unsatisfactory motor activity during their time at school; the speed-coordination and speed-force capacities of primary classes girls from Tataresti locality are low, comparing to Singerei and Causeni districts.

The study of negative factors of physical development of girls from the primary classes in the rural educational institutions, shown in Table 3, proves that according to the presence of flat foot, the first place is held by the girls from Singerei district (35%), the second place – by the girls from Tataresti district (26,66%) and the third place – by girls from Causeni district (13,33%). According to the number of girls from the primary classes who have scoliosis, the first place is held again by Singerei district (11,67%), the second place – by Tataresti district (10,00%), and the third place – by Causeni district (5,00%). The presence of the first stage of obesity at girls from primary classes had been found at a relatively low number of girls in Tataresti district (6,66%), which corresponds to their Quetelet indexes (93,34%).

Table 3. The existence of negative factors of physical development of girls of primary classes in the rural educational institutions of the Republic of Moldova

No.	Negative factors of physical development	Tataresti	Singerei	Causeni	Average index	Distribution of places according to the existence of negative factors		
						I	II	III
1	Flat foot %	26,66	35,00	13,33	25,00	Singerei	Tataresti	Causeni
2	Scoliosis %	10,00	11,67	5,00	8,89	Singerei	Tataresti	Causeni
3	Obesity %	6,66	-	-	6,66	Tataresti	-	-

Hence, the investigation results of girls of primary classes from the rural educational institutions of Tataresti locality and of Singerei and Causeni districts show that according to their physical development, children grow and develop in accordance with physiological age laws and the existent regional peculiarities, including negative ones.

The motor state of the investigated girls of primary classes from the rural area shows that in the majority of cases is relatively the same in all localities and reflects, as a rule, the insufficient motor activity during studies.

Moreover, we are concerned about the fact that girls do not show true increasing results in the motor preparedness at the following stages of primary education from each assessed region. In our opinion, such results, the majority of them, show little improvement only due to the natural physiological development of children. We believe that this means that the efficiency of guided physical training of girls from the

investigated primary classes is very low and has no developmental peculiarities.

The insufficient motor preparedness of girls is directly linked with the existence of negative factors, among which we can specify flat foot, scoliosis and obesity, as factors that hamper their motor development and had been detected in all education institutions from rural areas, but especially in Singerei district and Tataresti.

In conclusion, we can state that physical development of girls from the investigated districts is complying with the existent physiological age laws and regional peculiarities, including negative ones.

The motor state of boys and girls of primary classes from the rural area of investigated districts shows that it is relatively the same in all localities and reflects in the majority of cases the insufficient motor activity during school time.

The motor preparedness of boys and girls from primary classes from the rural areas of the investigated districts shows that it is relatively the same in all localities and reflects in the majority of cases the insufficient motor activity during the studies.

The efficiency of guided physical training of girls from the investigated primary classes is very low and does not have the necessary developmental peculiarities.

The insufficient motor activity of ., including the mandatory physical training in school, leads to primary stages of obesity of girls in primary classes, detected in the majority of cases in the fourth grade.

The prophylactic activity for preventing and averting the development of flat foot, scoliosis and obesity in children from the rural area, as negative factors of their development, is incorrectly organized and ensured.

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Titlul: Starea dezvoltării fizice, a pregătirii motrice și a disfuncțiilor aparatului locomotor a fetițelor claselor primare în zonele rurale ale Republicii Moldova

Cuvinte-cheie: elevii școlilor primare din zonele rurale, dezvoltarea fizică, pregătirea motrică, coloana vertebrală, deficiențele ortopedice, scolioza, platfusul, obezitatea, aparatul locomotor, exercițiile fizice, terapia fizică.

Rezumat. Prezentul articol descrie informația experimental-analitică privind starea dezvoltării fizice, pregătirea motrică, existența factorilor negativi (scolioza, platfusul și obezitatea) elevilor școlilor primare (fete) din zonele rurale ale Republicii Moldova. Această informație va permite cunoașterea situației și crearea unui proces educațional și de dezvoltare a educației fizice, luând în considerație starea elevilor școlilor medii din orașe.