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## TRACKING FUNCTIONAL DYNAMICS IN MOTOR POTENTIAL FOR DEVELOPMENT OF WELLNESS CULTURE

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### ABSTRACT

The purpose of the study is to track the dynamics of the motor potential of students in the establishment of a Wellness culture<sup>1</sup>. The subject of the analysis are indicators in establishing the dynamics of the motor potential in tracked cognitive periods. Object of research - the pedagogical process of establishing the Wellness culture in the subject of physical education and sports through the application of current educational tools, promoting the health and well-being of students, building motor skills - a basis for Wellness in school. In a one-year period of the academic year 2021/22, motor potential was measured at the initial stage of the educational degree. A regression analysis based on mathematical-statistical processing in deriving correlation and variation coefficients was applied to derive a relationship between the motor indicators.

**Key words:** Wellness culture, functional dynamics, motor potential, Wellness in school

### INTRODUCTION

Promoting health and well-being of adolescents through school initiatives for health promotion in the context of the guidelines laid down in the law on preschool and primary school education. Providing the knowledge, skills and attitudes necessary to maintain health is a logical approach to combating serious threats to motor and mental well-being. The characteristics of the school environment make it particularly suitable for promoting health and well-being. Schools are a strategic location for health initiatives, allowing large numbers of young people to be targeted with information and support. Teachers, coaches and other school staff have a significant impact on young people's knowledge, skills, attitudes and beliefs. Schools offer access to facilities and equipment supporting physical activity, healthy

eating and social interaction. Numerous leading authors conduct research in this area to prove the effectiveness of Recreational and Wellness programs, products, and services (1-5). Among all of them, programs and Wellness have the highest social impact, ensuring the sustainability of students' health (6). Recreational and Wellness innovative methods, exercise programs, and complexes of exercises aimed at balancing motor potential, effective motivation, and motor activity of young people around the world are being sought (7-9). Analyzing the results in two cognitive levels of the conducted experimental research, significant changes were found regarding improved motor activity in functional dynamics of tracked indicators. The results are due to ontogenetic development in studied period and the impact of entire educational and pedagogical process, which is analyzed, visualized and presented in subsequent graphs and tables.

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<sup>1</sup>Wellness culture represents knowledge, intellectual and practical skills, creating relationships in the process of education and developing the personality to achieve a healthy lifestyle in a long-term aspect.

## METHODS

The aim of study was to track the development of functional dynamics of motor characteristics in 7-10 year old students, as well as the application of objective tools in their measurement. The subject of analysis are indicators in establishing dynamics of motor potential in tracked cognitive periods. The object of research was pedagogical process of establishing a wellness culture in the subject of physical education and sports through application of current educational tools, building motor skills. In the period of academic year 2021-22, a measurement was carried out in functional dynamics by tracking and analyzing following physiometric indicators when establishing dynamics of motor activity: 40 m running; 200 m running; long jump from place; long jump with reinforcement; high jump from a place with two feet; throw ball 150 g - comfortable hand; throwing ball 1 kg. - overhead.

The conducted research was carried out with students from initial stage of basic educational level. A regression analysis based on statistical processing in deriving correlation and variation coefficients and establishing relationship between studied indicators was applied to derive a relationship between motor indicators. The research procedure took place in a metropolitan school. Physiometric characteristics of 82 students from a metropolitan school were studied, and dynamics in the results of two target groups were followed.

## RESULTS

Dynamics - physiometric indicators

Significantly increased values were registered in dynamics of vital capacity indicator (**Figure 1**).

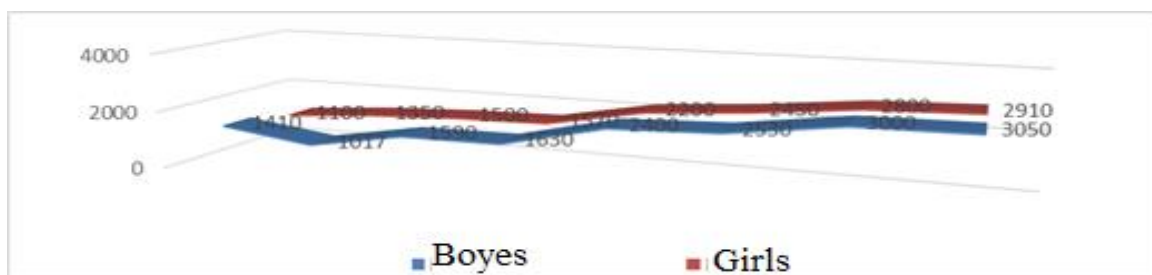


Figure 1. Vital capacity - cm<sup>3</sup>

In boys, an increase in vital capacity is outlined with average values for 1st grade - 1814 cm<sup>3</sup>, 2nd grade - 1967 cm<sup>3</sup>, 3rd grade - 2206 cm<sup>3</sup>, 4th grade - 2350 cm<sup>3</sup>. The total increase is 542 cm<sup>3</sup>, (28.6%). The dynamics of this indicator for girls is reflected in **Figure 1**. Girls have a total increase of 689 cm<sup>3</sup>, (48.1%).

Variation coefficient V is in the range of 15-20%. Boys are distinguished by higher values of vital capacity than girls. As age increases, the

difference between two target groups gradually decreases. For tracked period, girls 45.4% have a much higher percentage increase than boys 29.5%.

We assume that acceleration and increase in motor capacity had a beneficial effect on development of this physiometric indicator in girls, compensating for lag in the preschool period compared to boys. Static strength of upper limbs - increases evenly throughout tracked period.

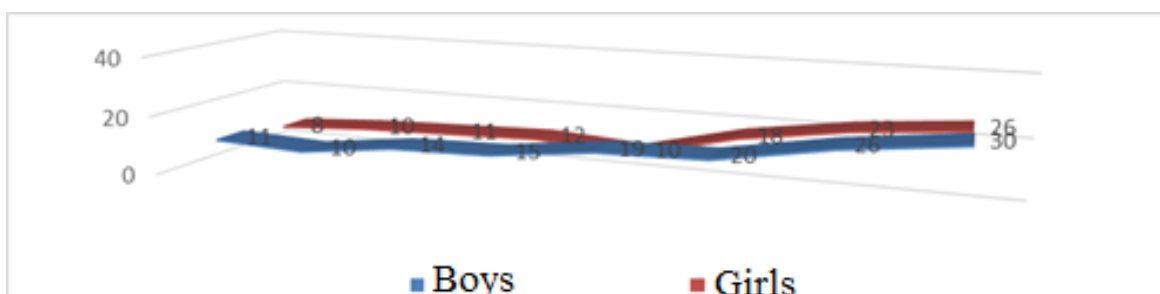


Figure 2. Right hand strength - kg.

Growth in strength of right hand in boys starts from 14.5 kg. – 1st grade and up to 19.5 kg. – 4th grade. For girls, these values are 13.3 kg. and 17.4 kg. The difference in static right-hand strength between girls and boys remained almost unchanged for entire studied period.

For left hand it shows an upward trend. The increased difference can be explained by an increase in functional asymmetry of upper limbs with age. The situation is similar for girls.

Comparing the achievements of boys and girls, following trend is observed: with increasing age, difference between absolute values of this indicator also increases. The difference is especially pronounced in 3rd grade, when girls lag behind boys by 2.7 kg. for right hand and with 2.1 kg. for left hand (Figure 3). The coefficient of variation V also increased with increasing age from 14% to 21%, being slightly higher in boys. The overall increase in boys is higher than girls. The increment for right hand is higher than left. The situation is similar for girls.

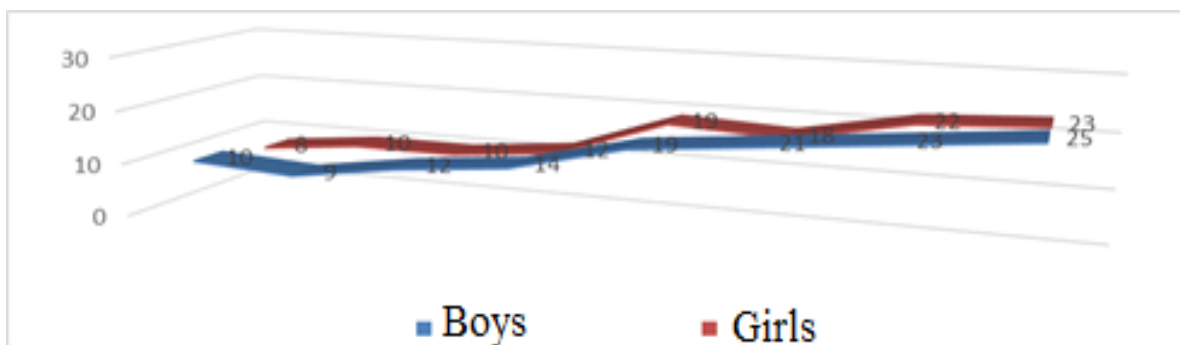


Figure 3. Left hand strength

The obtained results are purposeful work for developed strength of arms and shoulder girdle. There are no studies in studied literature with which we could more objectively compare

obtained data. With increasing age, the dynamics of standing strength marks a regular upward development of strength capabilities in both genders (Figure 4).

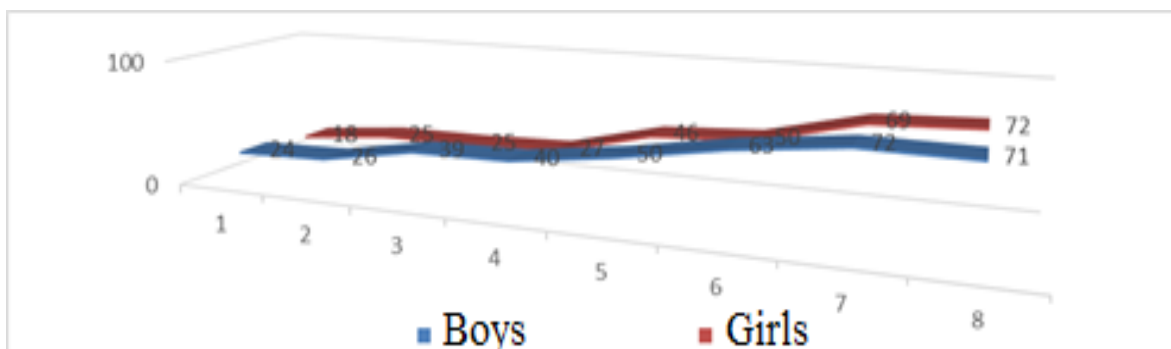


Figure 4. Standing strength - kg.

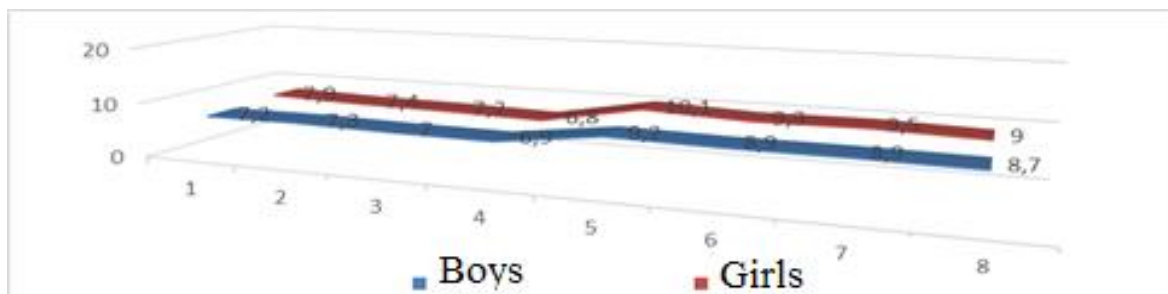
Boys - increase from 36.5 kg to 55.1 kg, girls from 30.8 kg to 42.3 kg. The total increase in boys is 19 kg - 50.6%, and girls - 12.9 kg - 38.8%. The girls gradually lagging behind boys. If in 1st grade they are behind boys by 5.7 kg, then in 2nd grade difference increases to 7.4 kg, and in 3rd grade it is 14.4 kg. The two genders have approximately same increase, with a slight preponderance of girls at 3%. Results - analysis of average relative growth (Table 1)

The close values show that the motor load is adequate and affects two target groups relatively equally.

Dynamics of motor activity - 40m running  
Continuous, uneven increase in result of 40 m running in both genders (Figure 5).

**Table 1.** Average relative growth - percentage ratio

Gender	Boys	Girls
Indicators	%	%
Vital capacity	29,5	45,4
Right hand strength	34,5	30,8
Left handed strength	49,6	41,1
Standing strength	40	37,3
Average relative growth	38,4	38,6



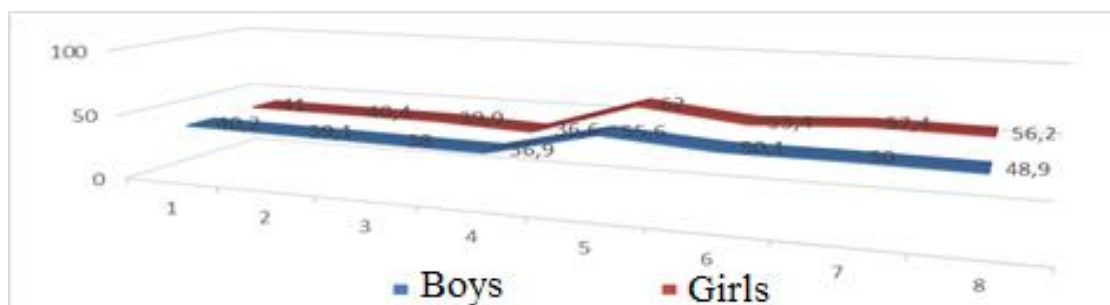
**Figure 5.** 40 m running - seconds

Boys – coefficient of variation is above critical 10%, varies 16% -20.1%. A unidirectionality in change is observed. As age increases, so does the variance of V.

Girls - coefficient of variation shows a slight tendency towards dispersion with increasing age, 18.3% - 22.7%. The overall speed increase is 8.1%. A period of intense growth is not observed. When comparing data from 40 m running, the boys are superior. There is a weak tendency to

reduce difference between two genders in terms of age, both for 2nd and 3rd grade and both target groups. The overall growth in girls is higher than boys, as a result of established hypodynamia /result of reduced motor activity/.

Dynamics of motor activity - 200 m. running  
Results in 200 m running continue to increase proportionally with increasing age in both genders (**Figure 6**).



**Figure 6.** 200 m running - seconds

Tracking the achievements in terms of age, we find a tendency to reduce the gap with increasing age - boys. Girls are lagging behind boys in all ages. In 1st grade they have an achievement of 50.6 seconds, and in 4rd grade 46.81 seconds. The overall increase was 9.2% - a result much lower than boys' 18%. No unidirectionality was

observed in the V values in the different grades. In 1st grade, dispersion is close to 3rd grade - 15%, and in 2nd it is significantly lower - 7%. Dynamics motor activity - long jump from place  
With increasing age, speed-power capabilities have an uneven, upward character (**Figure 7**).

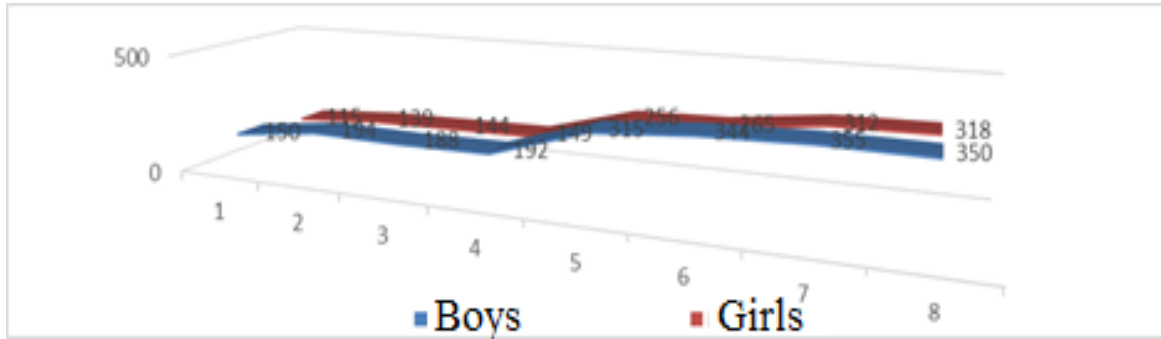


Figure 7. Long jump from place - centimeters

Boys: average relative growth 38.5%. Girls: increase by grade, as for both genders, the biggest difference in achievements is found in 1st grade. The total increase girls 15.8%. According to this indicator, girls' achievements are 10-15 cm. lower

than boys'. Pronounced trend: decrease in 4th grade.

Dynamics of motor activity - long jump with reinforcement

Jump length for both genders increases with growth (Figure 8).

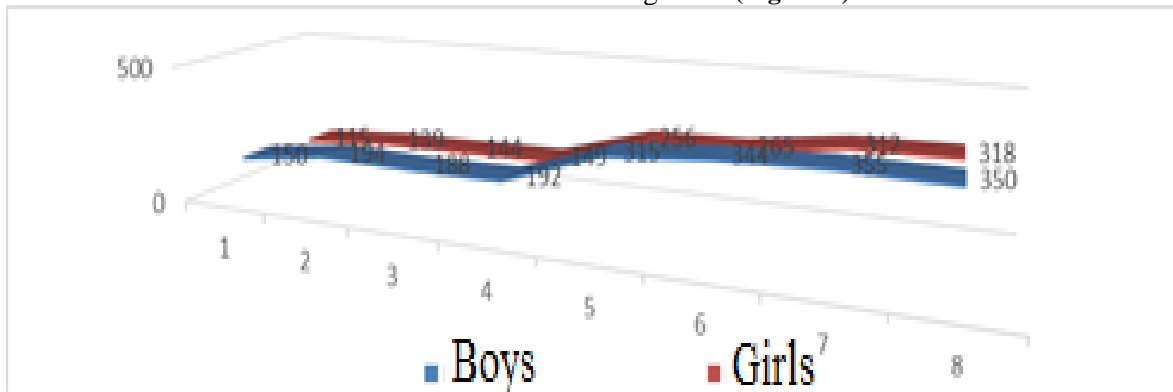


Figure 8. Long jump with gain – centimeters

Boys: overall increase in this indicator is 38.5%. Girls: total increase is 27.7%, an indicator of weaker speed-power and partly coordination abilities compared to boys.

increasing age: 38.7 cm in the 1st grade to 74.1 cm in the 4th grade.

Finding: girls lag behind boys in terms of speed and strength.

Achievements: long jump with boost have a higher V factor than achievements: long jump from place. The magnitude of variance ranged from 14.3% to 19.9%, similar for both genders. Girls lag significantly behind boys in this indicator. The difference increases with

Dynamics of motor activity - high jump from a place with two legs.

Growth of achievements with increasing age (Figure 9).

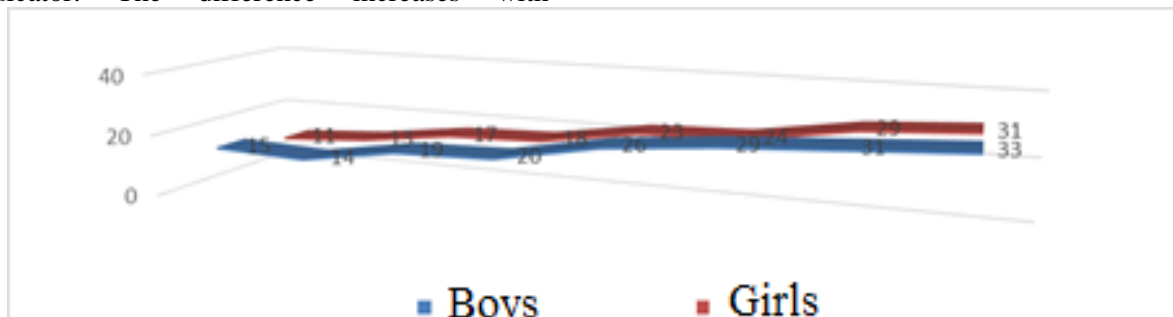
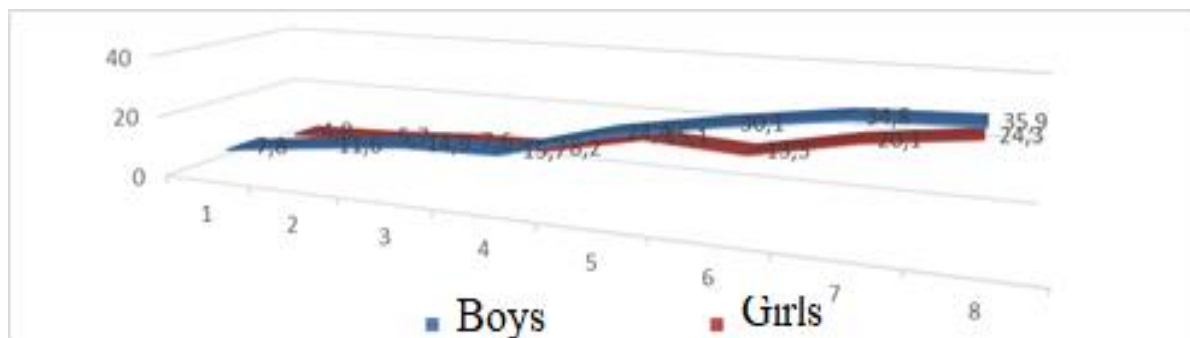


Figure 9. Jump height - centimeters

The rebound in boys is increasing, overall increase in this indicator is 34.6%. Girls - total increase 73.3%. When comparing results, we find that boys are superior to girls, with smallest difference in 2nd grade - 1.9cm, and biggest in 3rd grade - 2.5cm. Coefficient V moves within range of 12.4% -17.3% without detecting regularities in dynamics.

Dynamics of motor activity - throwing a ball – 150 grams - comfortable hand

Similar to other indicators, increase continues when throwing 150 grams ball for both target groups (**Figure 10**).



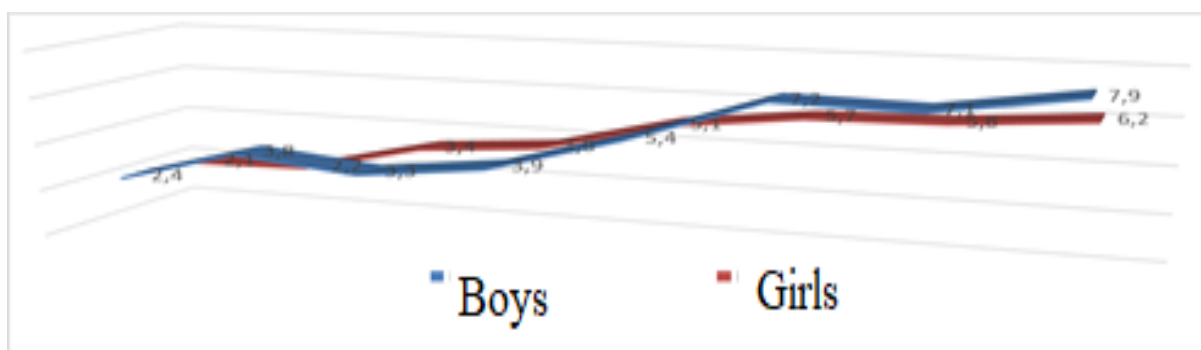
**Figure 10.** Throwing small solid ball - 150 grams - meters

The boys throw a ball in 1st grade 16.8m, increasing their achievement in 4th grade to 24.9m, an overall increase of 61.1%. The girls have achievements in 1st grade on average 8.84m, and in 4th grade 22.8m. Total increase - 37%, significantly lower than recorded for boys. At all ages, boys score higher than girls. With increasing age, this difference increases and is especially pronounced in 3rd-4th grade, when boys throw 10.9m - 15.32m more than girls. Coefficient V for both genders - very close. Boys - establishing

weak trend in decreasing variance with increasing age - between 29-22%.

Dynamics of motor activity - throwing ball 1 kg. – overhead

Information explosive strength upper limbs, from parts of torso and lower limbs, increasing achievements are found with age (**Figure 11**). In period of 7-10 years, speed-power indicators for upper limbs are constantly increasing. For boys from 4.01m in 1st grade to 5.47m in 4th. The total increase in this indicator is 36.8%.



**Figure 11.** Throwing 1 kg ball - meters

Girls - achievement 1st grade 3.56m, and in 4th grade they reach 4.88m. The total increase for 1-4th grade 39.8%. Boys - higher results than girls - the difference varies from 0.20m - 0.83m.

Coefficient V with increasing age changes within 19% - 23.5% for both genders.

Results analysis average relative growth - 1-4th grade - **Table 2**.

**Table 2.** Analysis of average relative increase in motor activity 1-4 grade

Gender	Boys	Girls
Indicators	%	%
40m running – sec.	8,5	9,1
200m running – sec.	18	9,2
Long jump from place - cm	9,5	15,8
Long jump with reinforcement	14,3	27,7
High jump - cm	34,6	39,8
Throwing small solid ball (150) g - m	60,1	39,3
Throwing 1 kg ball - meters	36,7	37
Average relative growth	28,3	31,12

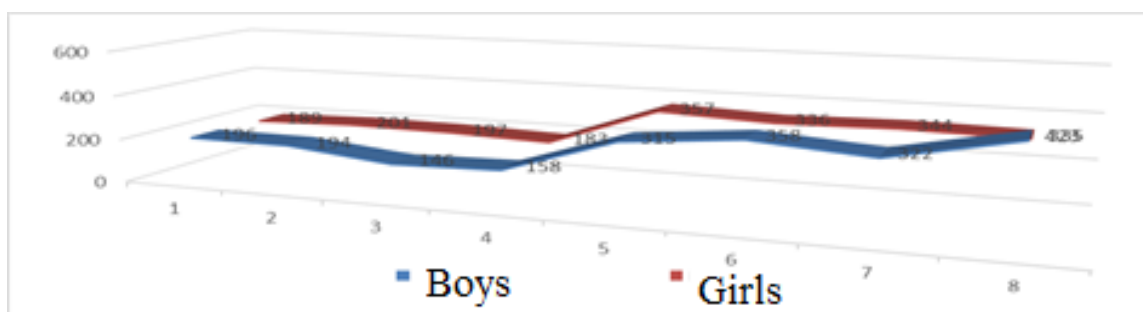
Finding: there are close values of average relative growth of motor activity in both genders, with a preponderance for girls of 3%, which is practically insignificant.

Conclusion: an improvement in results was observed for all tracked indications. As age increases, boys have higher achievement than girls. Boys significantly outperform girls in terms of speed and strength (40m running, standing long

jump, long jump with reinforcement, 150 g ball throw and 1 kg ball throw).

Dynamics of neuro-psychic reactivity - indicator of speed of a simple motor reaction

We judge the speed of a motor reaction by its latency period. The data on latent period of a simple motor reaction prove its regular shortening with increasing age (**Figure 12**).

**Figure 12.** Speed of simple motor reaction - m/sec

The analysis of **Figure 11** shows that with increasing age, the speed of motor reaction to a light stimulus also increases - boys: 1st grade from 247.5m/sec to 203m/sec in 4th grade. A similar regularity is observed among girls, occurring at lower level. Their achievement values increase from 279.1 m/s to 247.3 m/s. The comparative results between two genders show a tendency for difference between them to decrease: 2nd grade by 2.2m/s and to increase in 3rd by 28.5m/s to reach 44.3m/s in 4th grade. V on this indicator is within 15%-25% with a tendency to increase with the growth. Overall relative growth: girls - 21.9%, boys - 12.8%.

## RESULTS

- The overall increase in girls is higher than boys, as a result of observed hypodynamia in tracked dynamics of 40 m running.
- Results - 200m run. continue to increase proportionally with increasing age in both genders.
- The dynamics in motor activity - long jump from a place indicates: that with increasing age, speed-power capabilities have an uneven, ascending character in both genders.
- Dynamics in motor activity - length jump with strengthening indicates: both genders increase with increasing age.

- Girls are lagging behind boys in terms of speed-power capabilities for long jump with reinforcement.
- Dynamics in motor activity - high jump from a place with two legs indicates: increase in achievements with increasing age
- The increase continues when throwing 150 g ball for both target groups.
- Dynamics of motor activity - throwing ball - 150g - comfortable hand, growth continues for both target groups.
- Dynamics of motor activity - throwing ball 1 kg. - above the head - overall increase in this indicator is with a preponderance of boys.
- Results analysis of average relative growth - 1-4 th grade, with close values of average relative growth of motor activity for both genders, with a 3% advantage for girls, which is practically insignificant.
- The close values in dynamics of tracked indicators show that motor load is adequate and affects two target groups relatively equally for tracked average relative growth.
- With increasing age, dynamics of becoming strength marks a regular upward development of strength capabilities in both genders.

## CONCLUSION

Improvement in outcome was observed for all study markers. As age increases, boys have higher achievement than girls. Boys significantly outperformed girls in terms of speed and strength (40m running, standing long jump, long jump with reinforcement, 150 g ball throw and 1 kg ball throw).

We can summarize obtained results:

- The main physiometric signs grow relatively evenly for both genders.
- The differences between two genders are clearly outlined at the end of study.

Based on research conducted in tracking the dynamics of motor potential, an indisputable affirmation of Wellness culture among students from initial stage of basic educational level has been established.

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