



INFLUENCE OF SPEED-STRENGTH TRAINING ON THE CONCENTRATION INDICATORS OF SCHOOLCHILDREN AGED 13-14 YEARS WITH DIFFERENT TYPOLOGY

Georgiy Georgievich Polevoy^{1-3*}

1. *Department of Physical Education, Moscow Aviation Institute (National Research University), Moscow, Russia.*
2. *Department of Physical Education, Moscow Polytechnic University, Moscow, Russia.*
3. *Department of Physical Education, Vyatka State University, Kirov, Russia.*

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ABSTRACT

The present article aimed to investigate the effect of speed-strength classes on the concentration indicators of thirteen- to fourteen-year-old students with diverse typologies. The study period was three months. All physical education classes were held for 40 minutes and twice a week. Students from the control class (20 children) studied based on the common program, and students from the special group (20 children) further carried out a set of speed and strength exercises. All students performed the tapping test (strength of the nervous system) and the Bourdon test (concentration of attention). After a special study, the concentration values in the control class in kids with a strong nervous system improved by 5% ($p>0.05$) and with a weak one - by 6% ($p>0.05$). In the experimental class, concentration indicators increased by 13% ($p<0.05$) in schoolchildren with a strong nervous system and with a weak one - by 16% ($p<0.05$). It is necessary to perform a group of physical exercises that affect the development of strength and speed abilities in physical education classes at school. Physical activity for students aged 13-14 years should be differentiated considering the strength of the nervous system. As a result, the indicators of strength and speed qualities will improve and the indicators of students' concentration.

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Introduction

In recent years, the topic of physical development and physical training of children in schools has become increasingly relevant. An important role is given to physical education lessons at school [1-3], Next to the teacher in class, children learn new exercises better and perform more complex motor actions elements. However, suppose in primary school age the actual topic is the level of development of coordination abilities, then in the middle level. In that case, the speed and strength training of schoolchildren comes to the fore. Since 13-14 years of age is favorable for the enhancement of speed and strength abilities from a physiological point of view [4-6].

The aim of the previously studied exercises was to develop the strength and speed qualities that have shown their effectiveness [7]. The quality of classes will be higher. The efficacy of the differentiated method of quality development, which is based on the typology of students [8], was proved. Through this procedure, you can use the body reserves of each schoolchild to the maximum values.

However, at this stage of the study, we had to find out how this set of exercises affects the concentration indicators of schoolchildren with different typologies.

It is known that motor activity and thought processes are interconnected [9-11].

The present research aimed to investigate the impact of strength and speed training on the concentration indicators of thirteen to fourteen-year-old schoolchildren with diverse nervous system strengths.

Table 2 shows that students having a strong nervous system increased their concentration from 72.3 ± 8.3 to 75.9 ± 8.8 ($p > 0.05$), while students with a weak nervous system improved their concentration by only 6% ($p > 0.05$). In both subgroups, the indicators remained at the level of "Good." Such indicators of concentration of attention can indicate quite a good efficiency of the usual physical education program, in which schoolchildren are engaged.

However, in comparison with CG, the indicators in EG indicate a greater efficiency of using the complex of strength and speed capabilities, considering the typology of children. In students with a strong nervous system, concentration indicators improved from 72.1 ± 6.8 to 83.6 ± 7.9 ($p < 0.05$). And for the weak - by 16% ($p < 0.05$). In both subgroups, students improved their concentration indicators from "Good" to "Excellent."

At the beginning of the article, we talked about the benefits of physical culture for developing children's physical abilities; of course, many authors agree with this point of view. Only sports training can be more effective than a physical education lesson at school. However, not every schoolchild is engaged in sports [1-3].

The results that we received in this article in CG suggest that the usual method of physical education at school, which is relevant for Russian schoolchildren, is quite good. We can guess that physical education lessons using this technique positively affect the concentration of students' attention. The opinion that physical culture positively affects many mental processes is confirmed by some experimental methods [9-13].

The impact of a distinguished procedure in working with students of both primary and secondary school age is considered, previous studies confirm this hypothesis [14-16].

The results of the study in the EG give us information that students' speed and strength qualities have a positive effect on the concentration of children's attention, especially if the load was taking into account their nervous system since the indicators of schoolchildren from the EG were significantly higher at the end of the study than those shown by both subgroups' schoolchildren from the CG.

In this study, the effect of the speed-strength capabilities on the concentration indicators in 13-14 years old schoolchildren was revealed for the first time considering their nervous system strength. The results of this study prove the influence of implementing a group of exercises aimed at investigated qualities. Thus, the goal of the study was achieved.

Conclusion

In a regular school, during physical education classes at school, after a little warm-up and stretching exercises, it is necessary to perform a group of physical exercises that create strength and speed qualities. Physical activity for thirteen to fourteen-year-old schoolchildren must be differentiated, taking into account the nervous system strength. Thus, speed and strength abilities indicators, as well as students' concentration indicators, will improve.

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References

1. Shuba LV. Modern approach to implementation of health-related technology for primary school children. *Pedagogics, Psychol, Med-Biol Probl Phys Train Sports*. 2016;20(2):66-71. doi:10.15561/18189172.2016.0210
2. Donnelly J, Hillman C, Castelli D, Etnier J, Lee S, Tomporowski P, et al. Physical Activity, Fitness, Cognitive Function, and Academic Achievement in Children: A Systematic Review. *Med Sci Sports Exerc*. 2016;48(6):1197-222. doi:10.1249/MSS.0000000000000901
3. De Giorgio A, Kuvacic G, Milic M, Padulo J. The Brain and Movement: How Physical Activity Affects the Brain. *Montenegrin J Sports Sci Med*. 2018;7(2):63-8. doi:10.26773/mjssm.180910
4. Van Hooren B, Croix MD. Sensitive periods to train general motor abilities in children and adolescents: do they exist? A critical appraisal. *Strength Cond J*. 2020;42(6):7-14. doi:10.1519/SSC.0000000000000545
5. Solum M, Lorås H, Pedersen AV. A Golden Age for Motor Skill Learning? Learning of an Unfamiliar Motor Task in 10-Year-Olds, Young Adults, and Adults, When Starting from Similar Baselines. *Front Psychol*. 2020;11:538. doi:10.3389/fpsyg.2020.00538
6. Ford P, Croix MDS, Lloyd R, Meyers R, Moosavi M, Oliver J, et al. The Long-Term Athlete Development model: Physiological evidence and application. *J Sports Sci*. 2011;29(4):389-402. doi:10.1080/02640414.2010.536849
7. Kainov AN, Kuryerova GI. Working programs. Physical Culture. Grades 1-11. Comprehensive program of physical education of schoolchildren. Teacher; 2019. 169 p.

8. Georgiy P. The development of speed-power qualities of schoolchildren with different typologies applying coordination training. *Pedagogics, Psychol, Med-Biol Probl Phys Train Sports*. 2019;23(1):43-6. doi:10.15561/18189172.2019.0107
9. Bidzan-Bluma I, Lipowska M. Physical Activity and Cognitive Functioning of Children. *Int J Environ Res Public Health*. 2018;15(4):800. doi:10.3390/ijerph15040800
10. Pietsch S, Böttcher C, Jansen P. Cognitive-Motor Coordination Training Improves Mental Rotation Performance in Primary School-Aged Children. *Mind Brain Educ*. 2017;11(4):176-80. doi:10.1111/mbe.12154
11. Gerber M, Kalak N, Lemola S, Clough PJ, Pühse U, Elliot S, et al. Adolescents' exercise and physical activity are associated with mental toughness. *Ment Health Phys Act*. 2012;5(1):35-42. doi:10.1016/j.mhpa.2012.02.004
12. Ruiz-Ariza A, Grao-Cruces A, Marques De Loureiro NE, Martinez-Lopez EJ. Influence of physical fitness on cognitive and academic performance in adolescents: A systematic review from 2005–2015. *Int Rev Sport Exerc Psychol*. 2016;10(1):108-33. doi:10.1080/1750984X.2016.1184699
13. Chaddock-Heyman L, Hillman CH, Cohen NJ, Kramer AF. The importance of physical activity and aerobic fitness for cognitive control and memory in children. *Monogr Soc Res Child Dev*. 2014;79(4):25-50. doi:10.1111/mono.12129
14. Gavin C, Tony P, Christine J, Starla MC. Differentiating Instruction in Physical Education: Personalization of Learning. *J Phys Educ Recreat Dance*. 2017;88(7):44-50. doi:10.1080/07303084.2017.1340205
15. Van Munster M, Lauren L, Michelle G. Universal Design for Learning and Differentiated Instruction in Physical Education. *Adapt Phys Activ Q*. 2019;36(3):1-19. doi:10.1123/apaq.2018-0145
16. Jarvis JM, Pill SA, Noble AG. Differentiated Pedagogy to Address Learner Diversity in Secondary Physical Education. *J Phys Educ Recreat Dance*. 2017;88(8):46-54. doi:10.1080/07303084.2017.1356771