# MOTOR SKILL TRAINING OF SECONDARY SCHOOL STUDENTS IN OUTDOOR PHYSICAL EDUCATION LESSONS BY APPLYING THE HANDBALL METHODS

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*Abstract. The discipline of physical education and sports is an important field for high school students. In physical education lessons, the use of interactive methods leads to stimulating students' interest in performing physical exercises, increasing the efficiency of the lesson, motivation to learn and discover new acts and actions. In order to have good results in the proposed activities, there must be a harmony between physical condition, basic physical abilities and specific ones. Properly performed physical exercises develop the basic motor qualities (speed, dexterity, suppleness, endurance, strength) that are indispensable to our lives. The research methods used in the experiment were: the method of bibliographic study, the method of observation, the method of tests, the mathematical method as well as the graphic and tabular method. The purpose of this experimental study is based on identifying the motor level of seventh grade students and obtaining better results that lead to progress in order to increase the efficiency of the physical education lesson. Therefore, different means were applied to the experiment class, and the control class followed the school curriculum.*

*Keywords: pupils, gymnasium, exercise, efficiency.*

## Introduction

Physical education, from the perspective of Triboi V. [16, p.65] represents a "component of general education, expressed through a type of motor activity (along with sports training, competition, leisure activities, body expression activities and recovery activities), carried out in an organized or independent way, whose specifically conceived content aims at optimizing the biomotor potential of the individual, as well as its cognitive, affective and social-relational components and therefore obtaining the quality of life".

Compared to the other school lessons, the physical education lesson differs in content, structure, methodology, development space and specific learning. Specific learning aims at educating motor skill, training motor skill and abilities, as well as practicing physical exercises. Physical exercise in lessons is considered the most important basic means in designing the instructional-educational process and in achieving the objectives of physical education. Physical exercise [11, p.11] is a motor act that is performed with the help of a muscle or a muscle group aiming to repeat the same movement several times.

With the introduction of physical education and sports in schools, the practice of physical exercises takes place in an organized framework. In social life, the role of sport becomes very important, and exercises are also practiced in free time by different classes of the population.

Researchers in the field of physical education and sports [2, 3, 4, 6] show us the value of the basic objectives that aim: maintaining optimal health, harmonious physical development, education of motor skill, training of motor skill and abilities, free practice of exercise and personality development.

Guzun A. [9, p.10-13] argues that physical education contributes to the development and improvement of students from a motor point of view, forms spiritual values, improves the functions of the musculoskeletal system due to the execution of physical exercises and maintains optimal health.

The discipline of physical education and sports is an important field for high school students. By its presence in the curriculum will benefits from two hours in the common and an extra hour in the form of optional, or sports ensemble, or extra hours for the training of the representative teams of the school, has gained an imposing status in this educational cycle. Several specialists [13,14] in the field specify that physical education is the discipline that deals with physical development, mental and moral development. Physical education is an important factor in the development of the individual and in increasing the physical and mental potential of the individual. This is an activity through which the individual manifests himself through different movements.

As several authors say [1, 5, 8, 10, 15] motor skill qualities are properties of the human body that ensure the performance of movement actions in everyday life or in physical education lessons using the indices of speed, skill, mobility, endurance and force.

**Research methodology and organization**

The subjects who participated in this experiment are students at the Technological High School "Iorgu Vârnav Liteanu", Liteni city, Suceava county. The research was conducted with the help of 40 students, from the seventh grade, 11 boys and 10 girls representing the experiment class and 9 boys and 10 girls on the control class.

The research methods used in the experiment were the bibliographic study, the observation, the test method, the mathematical method as well as the graphic and tabular method. Between September - November 2019 and September - November 2020, the students from the experiment class, carried

out activities according to a special planning created with handball means. The control class went through activities according to the specific curriculum of the training level.

According to order no. 4135 of April 21, 2020, elaborated by MEC [17], regarding the instructions of the learning process at the level of the pre-university education system, the courses conducted on-site are transformed at the level of Romania into online courses until the end of the school year. During the online activities, the students who were part of the experiment class, received materials in word, ppt, video format with reference to the game of handball: game rules, means specific to the game of handball, exercises for developing motor skill.

The motor skill tests used in the research are included in the Evaluation and Examination System for the discipline of physical education and sports in Romania [7,12] in close connection with the Ability Test developed by the International Federation of Physical Education. The motor skill tests were performed during the school year 2019-2020, in September the initial test, in November the intermediate test, and in the school year 2020-2021 at the end of November the final test, both in the experiment group and in the control group.

The motor skill tests list consists of the following tests: 30 m sprint running, 5x10m shuttle run test, standing long jump and pushups.

*Sprint running 30 m (seconds)* - running was performed on the segment of 30 m starting from the feet, starting with the auditory and visual signal. The result was recorded in seconds and tenths of a second using the digital stopwatch. Two attempts were made scoring the best result. This test is aimed at assessing travel speed.

*Shuttle run test 5x10 m (seconds)* - 5 runs were performed over a distance of 10 m, the starting line drawn with a line parallel to the finish line, maximum speed, the standing star, starting with the auditory and visual signal. A

single repetition was given and the result was recorded in seconds and tenths of a second using the digital stopwatch. This test aims at assessing speed and coordinating movements (skill).

*Standing long jump (m)* - standing long jump was performed, the toes being placed behind a line drawn on the ground, the measurement being made from the starting line and the last back heel placed on the ground. Two attempts were made scoring the best result. A measuring tape was used for the measurement. This test aims to assess the strength of the lower limbs.

*Pushups (no. repetitions)* - the arms were bent at the elbow joint until the chest approached the ground, then returned to the initial position, lying face down with support on the palms and legs, body stretched, looking down. For girls, palm support is performed on the gym bench. Only one repetition was given and the number of executions was noted. This test aims to assess the strength of the upper limbs.

Statistical method - in order to process the results from the initial, intermediate and final tests, from a statistical-mathematical point of view, the following indicators used in the literature were used: absolute amplitude, arithmetic average, standard deviation, average error, coefficient of variability and the T Student parametric criterion.

*Graphic and tabular method* - the presentation of the data obtained from the research through graphs and tables that allow the correct evaluation by the researcher, from one test to another.

**The results and their interpretation**

The motor skill tests used in the research are included in the Assessment and Examination System for the discipline of physical education and sport in Romania in close connection with the Ability Test developed by the International Federation of Physical Education.

**Table 1. Results obtained by girls, experiment class, in motor skill tests**

| No crt | Name | Sprint running 30 m (s) | | | Shuttle run test 5x10 m (s) | | | Standing long jump (m) | | | Pushups (no.) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $T_I$ | $T_{INT}$ | $T_F$ | $T_I$ | $T_{INT}$ | $T_F$ | $T_I$ | $T_{INT}$ | $T_F$ | $T_I$ | $T_{INT}$ | $T_F$ |
| 1. | A.S. | 7,24 | 5,70 | 5,32 | 17,50 | 15,51 | 14,12 | 1,33 | 1,58 | 1,82 | 4 | 7 | 10 |
| 2. | C.D. | 6,80 | 5,42 | 5,38 | 17,25 | 15,33 | 14,12 | 1,43 | 1,67 | 1,79 | 7 | 13 | 17 |
| 3. | C.A. | 7,02 | 5,06 | 5,02 | 17,30 | 15,11 | 13,62 | 1,66 | 1,81 | 1,89 | 12 | 17 | 20 |
| 4. | C.M. | 6,94 | 6,15 | 6,05 | 17,25 | 15,54 | 15,02 | 1,44 | 1,58 | 1,71 | 6 | 9 | 16 |
| 5. | G.E. | 7,10 | 6,30 | 6,02 | 17,65 | 15,76 | 14,37 | 1,28 | 1,43 | 1,70 | 8 | 15 | 18 |
| 6. | I.M. | 7,05 | 5,30 | 5,13 | 16,46 | 14,14 | 13,28 | 1,75 | 1,79 | 1,91 | 13 | 19 | 20 |
| 7. | L.M. | 6,98 | 6,15 | 6,12 | 17,00 | 15,19 | 14,68 | 1,22 | 1,49 | 1,74 | 9 | 17 | 19 |
| 8. | L.M. | 6,60 | 5,25 | 5,12 | 16,70 | 15,01 | 14,05 | 1,88 | 1,88 | 1,97 | 13 | 19 | 23 |
| 9. | M.M. | 6,98 | 6,32 | 5,97 | 16,98 | 15,58 | 15,02 | 1,54 | 1,68 | 1,82 | 5 | 8 | 14 |
| 10 | S.R. | 7,10 | 6,11 | 5,79 | 17,24 | 15,36 | 14,25 | 1,40 | 1,58 | 1,73 | 5 | 9 | 16 |
| | $A_a$ | 0,64 | 1,26 | 1,1 | 1,19 | 1,62 | 1,74 | 0,66 | 0,45 | 0,27 | 9 | 12 | 13 |
| | X | 6,98 | 5,78 | 5,59 | 17,13 | 15,25 | 14,25 | 1,49 | 1,65 | 1,81 | 8,20 | 13,30 | 17,30 |
| | □ | 0,18 | 0,48 | 0,44 | 0,36 | 0,45 | 0,56 | 0,21 | 0,14 | 0,09 | 3,43 | 4,72 | 3,62 |
| | ±m | 0,06 | 0,15 | 0,14 | 0,11 | 0,14 | 0,18 | 0,07 | 0,05 | 0,03 | 1,08 | 1,49 | 1,15 |
| | Cv% | 2,53 | 8,38 | 7,85 | 2,09 | 2,97 | 3,91 | 14,26 | 8,77 | 5,08 | 41,77 | 35,45 | 20,94 |

**Table 2. Results obtained by girls, control class, in motor skill tests**

| No crt | Name | Sprint running 30 m (s) | | | Shuttle run test 5x10 m (s) | | | Standing long jump (m) | | | Pushups (no.) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $T_I$ | $T_{INT}$ | $T_F$ | $T_I$ | $T_{INT}$ | $T_F$ | $T_I$ | $T_{INT}$ | $T_F$ | $T_I$ | $T_{INT}$ | $T_F$ |
| 1 | A.I. | 7,28 | 6,72 | 6,32 | 18,50 | 17,51 | 17,13 | 1,23 | 1,38 | 1,86 | 3 | 6 | 8 |
| 2 | A.M. | 6,82 | 6,42 | 6,15 | 17,42 | 16,35 | 15,79 | 1,53 | 1,62 | 1,63 | 9 | 12 | 12 |
| 3 | C.O. | 6,22 | 6,07 | 6,02 | 17,68 | 16,38 | 16,07 | 1,56 | 1,68 | 1,71 | 10 | 13 | 15 |
| 4 | D.A. | 6,89 | 6,30 | 6,09 | 17,24 | 16,74 | 16,14 | 1,37 | 1,48 | 1,57 | 12 | 16 | 19 |
| 5 | F.C. | 7,52 | 7,09 | 6,78 | 17,28 | 16,56 | 15,97 | 1,66 | 1,70 | 1,75 | 7 | 13 | 16 |
| 6 | L.B. | 6,64 | 6,18 | 6,13 | 16,85 | 16,14 | 16,01 | 1,41 | 1,63 | 1,70 | 8 | 14 | 18 |
| 7 | M.A. | 7,26 | 7,07 | 6,83 | 17,21 | 16,19 | 15,98 | 1,41 | 1,54 | 1,62 | 10 | 15 | 19 |
| 8 | O.F. | 6,64 | 6,23 | 6,12 | 16,27 | 16,01 | 15,45 | 1,48 | 1,56 | 1,61 | 12 | 17 | 21 |
| 9 | T.N. | 7,54 | 7,31 | 6,05 | 17,29 | 16,68 | 16,03 | 1,53 | 1,60 | 1,69 | 6 | 8 | 11 |
| 10 | V.A. | 7,40 | 7,17 | 6,87 | 17,63 | 16,76 | 15,28 | 1,38 | 1,46 | 1,59 | 5 | 8 | 13 |
| | $A_a$ | 1,32 | 1,24 | 0,85 | 2,23 | 1,5 | 1,85 | 0,43 | 0,32 | 0,29 | 9 | 11 | 13 |
| | X | 7,02 | 6,66 | 6,34 | 17,34 | 16,53 | 15,99 | 1,46 | 1,57 | 1,67 | 8,20 | 12,20 | 15,20 |
| | □ | 0,44 | 0,47 | 0,35 | 0,57 | 0,43 | 0,49 | 0,12 | 0,10 | 0,09 | 2,97 | 3,71 | 4,16 |
| | ±m | 0,14 | 0,15 | 0,11 | 0,18 | 0,14 | 0,16 | 0,04 | 0,03 | 0,03 | 0,94 | 1,17 | 1,32 |
| | Cv% | 6,33 | 7,06 | 5,50 | 3,31 | 2,61 | 3,07 | 8,33 | 6,50 | 5,25 | 36,27 | 30,38 | 27,36 |

**Table 3. Results obtained by boys, experiment class, in motor skill tests**

| No crt | Name | Sprint running 30 m (s) | | | Shuttle run test 5x10 m (s) | | | Standing long jump (m) | | | Pushups (no.) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $T_I$ | $T_{INT}$ | $T_F$ | $T_I$ | $T_{INT}$ | $T_F$ | $T_I$ | $T_{INT}$ | $T_F$ | $T_I$ | $T_{INT}$ | $T_F$ |
| 1 | A.I.S. | 7,12 | 5,3 | 5,1 | 16,29 | 14,6 | 13,35 | 1,73 | 1,92 | 2,15 | 9 | 15 | 21 |
| 2 | B.P. | 7,13 | 5,1 | 5,07 | 18,2 | 15,8 | 14,01 | 1,21 | 1,55 | 1,81 | 11 | 16 | 21 |
| 3 | I.F. | 7,21 | 5,36 | 5,3 | 17,98 | 16 | 13,5 | 1,34 | 1,6 | 1,89 | 9 | 12 | 19 |
| 4 | J.A. | 7,34 | 5,6 | 5,6 | 17,15 | 15,08 | 14,41 | 1,9 | 2,18 | 2,25 | 13 | 17 | 25 |
| 5 | M.C. | 7,72 | 6,24 | 5,81 | 17,17 | 15,03 | 13,59 | 1,52 | 1,72 | 2,01 | 11 | 16 | 26 |
| 6 | M.I. | 7,19 | 6,25 | 5,78 | 18,31 | 16,23 | 14,89 | 1,48 | 1,68 | 1,88 | 10 | 15 | 20 |
| 7 | O.I. | 7,79 | 6,14 | 5,65 | 18,27 | 16,96 | 15,03 | 1,5 | 1,6 | 1,83 | 13 | 18 | 23 |
| 8 | R.M. | 6,56 | 6,01 | 5,48 | 17,48 | 15,27 | 14,49 | 1,52 | 1,7 | 1,98 | 16 | 19 | 25 |
| 9 | R.E. | 7,14 | 6,28 | 5,79 | 18,58 | 16,47 | 14,32 | 1,24 | 1,41 | 1,71 | 14 | 17 | 24 |
| 10 | T.A. | 7,21 | 6,48 | 6,02 | 18,89 | 17,02 | 16,25 | 1,15 | 1,3 | 1,63 | 10 | 15 | 19 |
| 11 | V.F. | 7,78 | 7,14 | 6,48 | 19,59 | 17,1 | 16,16 | 1,33 | 1,6 | 1,82 | 11 | 15 | 20 |
| | $A_a$ | 1,23 | 2,04 | 1,41 | 3,3 | 2,5 | 2,9 | 0,75 | 0,88 | 0,62 | 7 | 7 | 7 |
| | X | 7,29 | 5,99 | 5,64 | 17,99 | 15,96 | 14,55 | 1,45 | 1,66 | 1,91 | 11,55 | 15,91 | 22,09 |
| | □ | 0,36 | 0,60 | 0,41 | 0,92 | 0,88 | 0,98 | 0,23 | 0,24 | 0,18 | 2,21 | 1,87 | 2,59 |
| | ±m | 0,11 | 0,18 | 0,12 | 0,28 | 0,27 | 0,30 | 0,07 | 0,07 | 0,06 | 0,67 | 0,56 | 0,78 |
| | Cv% | 4,97 | 10,04 | 7,26 | 5,12 | 5,52 | 6,76 | 15,64 | 14,24 | 9,56 | 19,12 | 11,74 | 11,71 |

**Table 4. Results obtained by boys, control class, in motor skill tests**

| No crt. | Name | Sprint running 30 m (s) | | | Shuttle run test 5x10 m (s) | | | Standing long jump (m) | | | Pushups (no.) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | $T_I$ | $T_{INT}$ | $T_F$ | $T_I$ | $T_{INT}$ | $T_F$ | $T_I$ | $T_{INT}$ | $T_F$ | $T_I$ | $T_{INT}$ | $T_F$ |
| 1 | A.T. | 7,34 | 6,31 | 6,28 | 17,31 | 16,62 | 16,10 | 1,63 | 1,71 | 1,84 | 12 | 17 | 19 |
| 2 | D.D. | 7,25 | 6,76 | 6,54 | 18,23 | 17,20 | 17,01 | 1,28 | 1,60 | 1,76 | 10 | 14 | 17 |
| 3 | F.A. | 7,23 | 6,39 | 6,29 | 17,93 | 17,10 | 16,40 | 1,29 | 1,54 | 1,71 | 10 | 15 | 16 |
| 4 | M.B. | 7,89 | 7,2 | 6,94 | 17,24 | 16,11 | 15,66 | 1,72 | 1,91 | 1,83 | 13 | 18 | 20 |
| 5 | M.D. | 6,96 | 6,34 | 5,01 | 17,21 | 16,13 | 14,59 | 1,46 | 1,84 | 1,9 | 12 | 16 | 19 |
| 6 | O.D. | 8,1 | 7,24 | 6,99 | 18,24 | 17,23 | 16,25 | 1,39 | 1,67 | 1,82 | 9 | 14 | 18 |
| 7 | P.D. | 7,78 | 7,2 | 6,92 | 17,28 | 16,74 | 15,21 | 1,48 | 1,63 | 1,73 | 11 | 17 | 19 |
| 8 | P.G. | 7,46 | 6,71 | 6,4 | 17,50 | 16,28 | 15,69 | 1,50 | 1,69 | 1,79 | 12 | 16 | 18 |
| 9 | S.C. | 7,47 | 7,01 | 6,82 | 18,21 | 16,49 | 16,12 | 1,26 | 1,45 | 1,72 | 14 | 18 | 23 |
| | $A_a$ | 1,14 | 0,93 | 1,98 | 1,03 | 1,12 | 2,42 | 0,46 | 0,46 | 0,19 | 5 | 4 | 7 |
| | X | 7,50 | 6,80 | 6,47 | 17,68 | 16,66 | 15,89 | 1,45 | 1,67 | 1,79 | 11,44 | 16,11 | 18,78 |
| | □ | 0,36 | 0,39 | 0,62 | 0,46 | 0,44 | 0,71 | 0,16 | 0,14 | 0,06 | 1,59 | 1,54 | 1,99 |
| | ±m | 0,12 | 0,13 | 0,21 | 0,15 | 0,15 | 0,24 | 0,05 | 0,05 | 0,02 | 0,53 | 0,51 | 0,66 |
| | Cv% | 4,82 | 5,67 | 9,51 | 2,61 | 2,66 | 4,44 | 11,01 | 8,47 | 3,58 | 13,89 | 9,54 | 10,58 |

**Table 5. Intergroup analysis of statistical indicators for motor skill tests of students in the experimental and control classes of girls at the initial, intermediate and final testing**

| No. crt. | Motor skill tests | Statistical indices | EC/CC | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | $T_I$ | $T_I$ | $T_{INT}$ | $T_{INT}$ | $T_F$ | $T_F$ |
| 1 | Sprint running 30m(s) | X ±m | 6,98±0,06 | 7,02±0,14 | 5,78±0,15 | 6,66±0,15 | 5,59±0,14 | 6,34±0,11,00 |
| | | t | 0,26 | | 4,12 | | 4,19 | |
| | | P | >0,05 | | <0,001 | | <0,001 | |
| 2 | Shuttle run test 5x10m(s) | X ±m | 17,13±0,11 | 17,34±0,18 | 15,25±0,14 | 16,53±0,14 | 14,25±0,18 | 15,99±0,16 |
| | | t | 0,95 | | 6,46 | | 7,37 | |
| | | P | >0,05 | | <0,001 | | <0,001 | |
| 3 | Standing long jump (cm) | X ±m | 1,49±0,07 | 1,46±0,04 | 1,65±0,05 | 1,57±0,03 | 1,81±0,03 | 1,67±0,03 |
| | | t | 0,47 | | 1,50 | | 3,35 | |
| | | P | >0,05 | | >0,05 | | <0,01 | |
| 4 | Pushups (no.) | X ±m | 8,2±1,08 | 8,20±0,94 | 13,3±1,49 | 12,2±1,17 | 17,3±1,15 | 15,2±1,32 |
| | | t | 0 | | 0,58 | | 2,84 | |
| | | P | >0,05 | | >0,05 | | <0,05 | |

Note: CE – Experimental class, n = 10; CC – Control class, n = 10.

P – 0,05; 0,01; 0,001;

f = 18; t = 2,100 2,878 3,921

For the motor skill test – **_Sprint running_**, the girls in the experiment class obtained an average value of 6.98 sec at initial testing, 5.78 sec, at intermediate testing and 5.59 sec at the final test. A difference of 1.39 sec can be seen between the initial test and the final test. In the control class, at the initial test, the girls obtained 7.02 sec, the intermediate test 6.66 sec and 6.34 sec at the final test (Figure 1). Between the initial and the final test, in the control group there is a difference of 0.68 sec.

**Table 6. Intergroup analysis of statistical indicators for motor skill tests of students in the boys' experiment and control classes at the initial, intermediate and final testing**

| No. crt. | Motor skill tests | Statistical indices | EC/CC | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | $T_I$ | $T_I$ | $T_I$ | $T_I$ | $T_I$ | $T_I$ |
| 1. | Sprint running 30m(s) | X ±m | 7,29±0,11 | 7,50±0,12 | 5,99±0,18 | 6,80±0,13 | 5,64±0,12 | 6,47±0,21 |
| | | t | 1,27 | | 3,46 | | 3,57 | |
| | | P | >0,05 | | <0,01 | | <0,01 | |
| 2. | Shuttle run test 5x10m(s) | X ±m | 17,99±0,28 | 17,68±0,15 | 15,96±0,27 | 16,66±0,15 | 14,55±0,30 | 15,89±0,24 |
| | | t | 0,91 | | 2,15 | | 3,44 | |
| | | P | >0,05 | | <0,05 | | <0,01 | |
| 3. | Standing long jump (cm) | X ±m | 1,45±0,07 | 1,45±0,05 | 1,66±0,07 | 1,67±0,05 | 1,91±0,06 | 1,79±0,02 |
| | | t | 0,01 | | 0,12 | | 1,82 | |
| | | P | >0,05 | | >0,05 | | >0,05 | |
| 4. | Pushups (no.) | X ±m | 11,55±0,67 | 11,44±0,53 | 15,91±0,56 | 16,11±0,51 | 22,09±0,78 | 18,78±0,66 |
| | | t | 0,11 | | 0,25 | | 3,15 | |
| | | P | >0,05 | | >0,05 | | <0,01 | |

Note:   CE – Experimental class, n = 10; CC – Control class, n = 10.
P – 0,05;   0,01;   0,001;
f = 18;  t  = 2,100    2,878    3,921
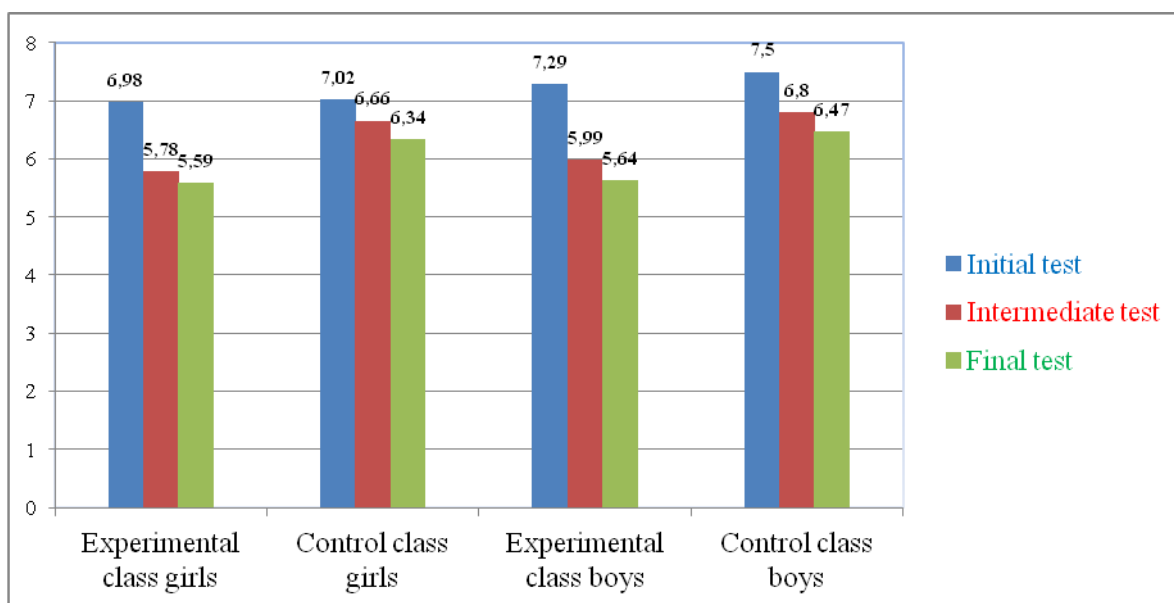


***Fig. 1. Graphical representation of results for motor skill tests of students in the experiment and control classes, girls and boys in the initial, intermediate and final tests, sprint running 30m***

Analyzing statistically both in the experiment group and in the control group, there are significant differences between the three tests. Comparing the experiment class with the control class at the initial test there is a value of 0.26, resulting in insignificant differences, P>0.05, at the intermediate test a value of 4.12 with significant differences, P<0.001 and at the final test a value of 4.19

resulting in significant differences, P<0.001 (Table 5).

The boys from the experiment class, at the **sprint running test**, obtained an average value of 7.29 sec at initial testing, 5.99 sec at intermediate testing and 5.64 sec at the final test. In the control class, at the initial testing, the boys obtained 7.5 sec, the intermediate test 6.8 sec and 6.47 sec at the final test. A difference of 1.65 sec can be seen between the initial test and the final test in the experiment class and 1.03 sec in the control class (Figure 1).

Analyzing statistically both in the experiment group and in the control group, there are significant differences between the three tests. Comparing the experiment class with the control class at the initial test there is a value of 1.27, resulting in insignificant differences, P>0.05, at the intermediate test a value of 3.46 with significant differences, P<0.001 and at the final test a value of 3.57

resulting in significant differences, P<0.001 (Table 6).

In the **5x10m shuttle run test**, the girls from the experiment class obtained an average value of 17.13 sec, at the initial test, 15.25 sec, at intermediate testing and 14.25 sec at the final test. A difference of 1.39 sec can be seen between the initial test and the final test. In the control class, at the initial test, the girls obtained 17.34 sec, the intermediate test 16.53 sec and 15.99 sec at the final test (Figure 2). Between the initial and the final test, in the control group there is a difference of 0.68 sec.

In both classes, analyzing statistically there are significant differences between the three tests.

Comparing the experiment class with the control class at the initial test there is a value of 0.95, resulting in insignificant differences, P>0.05, at the intermediate test a value of 6.46 with significant differences, P<0.001 and at the final test a value of 4.34 resulting in significant differences, P <0.001 (Table 5).
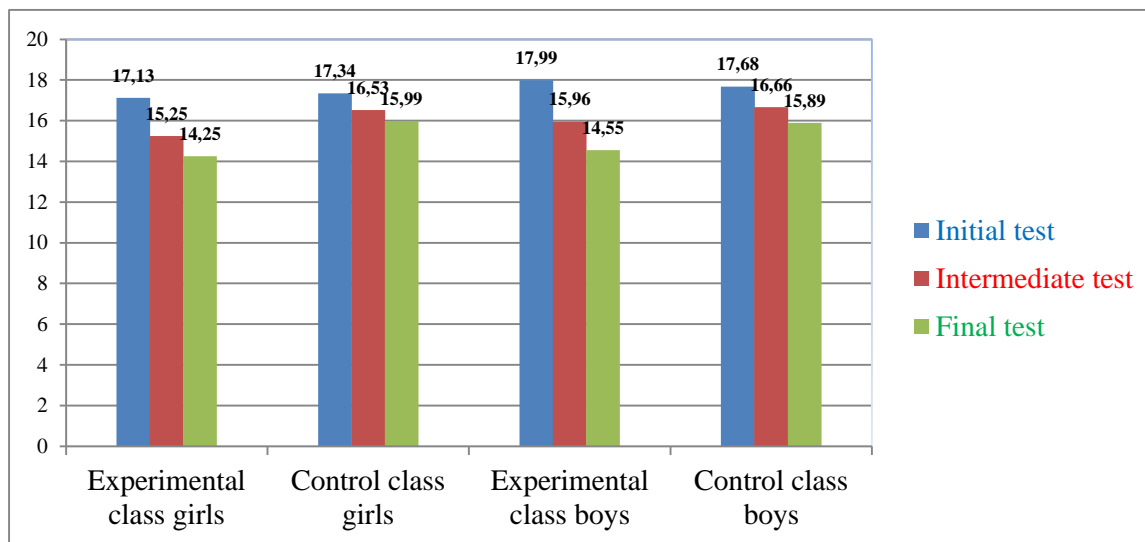


***Fig. 2. Graphic representation of results for motor skill tests of students in the experiment and control classes, girls and boys in the initial, intermediate and final tests, shuttle run test 5x10 m (s)***

In the **5x10m shuttle run test**, the boys in the experiment class obtained an average value of 17.99 sec at initial testing, 15.96 sec at intermediate testing and 14.55 sec at the final

test. A difference of 3.44 sec can be seen between the initial test and the final test. In the control class, at the initial testing, the boys obtained 17.68 sec, the intermediate test 16.66

sec and 15.89 sec at the final test (Figure 2). Between the initial and the final test, in the control group there is a difference of 1.79 sec.

Comparing the experiment class with the control class, from a statistical point of view at the initial test we obtained a value of 0.91, resulting in insignificant differences, P>0.05, at the intermediate test a value of 2.15 with significant differences, P<0.05 and at the final test a value of 3.44 resulting in significant differences, P<0.01 (Table 6).

The results obtained by the girls from the experiment class at the motor skill test, the standing long jump, have an average value of 1.49 m at the initial test, 1.65 m at the intermediate test and 1.81 m at the final test. In the control class, the girls get 1.46m in the initial test, 1.57 m in the intermediate test and 1.67 m in the final test (Figure 3). Between the initial and the final test, in the experiment group there is a difference of 0.32 m, and in the control group a difference of 0.21 m.
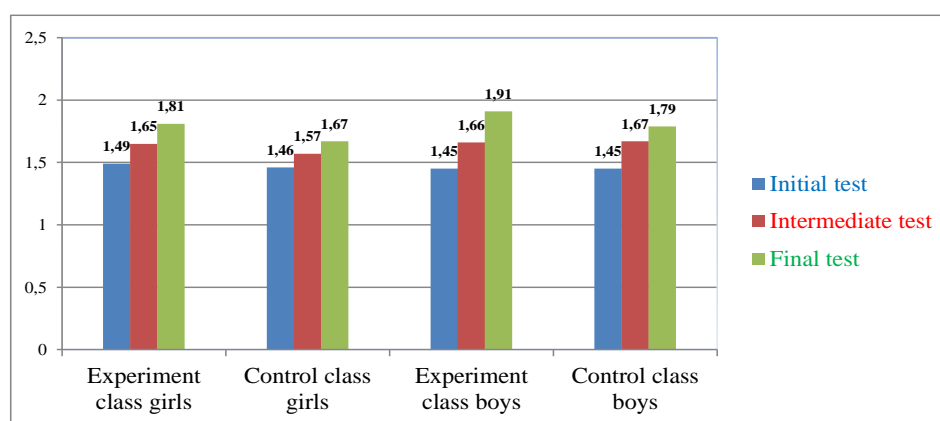


*Fig. 3. Graphical representation of results for motor skill tests of students in the experiment and control classes, girls and boys in the initial, intermediate and final tests, standing long jump*

Between the three tests, initial, intermediate and final, there is progress in both groups in this test. Carrying out the statistics between the two classes, a value of 0.47 is found, at the initial test and 1.50, at the intermediate test, the differences being insignificant, P>0.05, and at the final test obtaining a value of 3.35, P<0.01, resulting in significant differences (Table 5).

The boys from the experiment class, at the motor skill test the *standing long jump*, obtained at the initial test an average value of 1.45 m, at the intermediate test 1.66 m and 1.91 m at the final test. There is a difference of 0.46 m between the initial test and the final test. The boys from the control class, at the initial test obtained 1.45 m, at the intermediate test 1.67 m and 1.79 m at the final test (Figure

3). Between the initial and the final test, in the control group there is an increase of 0.34 m.

In both the experiment group and the control group, there are significant differences between the three tests. Statistically analyzing the experiment class with the control class, a value of 0.01 was recorded at the initial test, a value of 0.12 at the intermediate test and a value of 1.82 at the final test (Table 6).

At the *pushups* motor skill test, the girls in the experiment class obtained a difference of 9.1 between the initial test and the final test, and the girls in the control class obtained a difference of 7, with 2.1 less (Figure 4).

Analyzing statistically the results of the classes in the experiment, it is found in the initial and intermediate testing that they have similar results, there are no significant

differences between classes P>0.05, and in the final test there is a progress of 2.84, P<0.05, the differences being significant (Table 5).
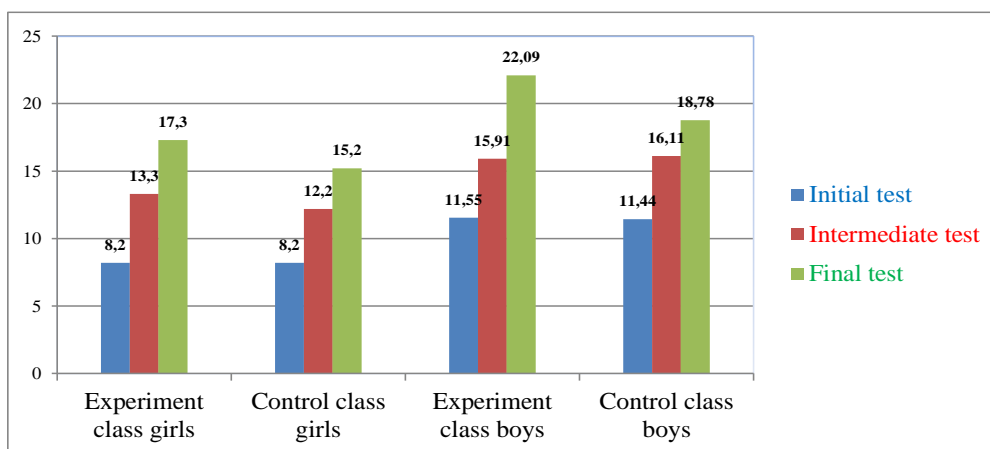


***Fig. 4. Graphical representation of the results for motor skill tests of students in the experiment and control classes, girls and boys in the initial, intermediate and final tests, pushups***

At the pushups motor skill test, the boys from both classes progressed from the initial test to the final one. The boys from the experiment class at the initial test performed an average of 11.55 repetitions and reached 22.09 at the final test, and the control class started from 11.44 and progressed to 18.78 (Figure 4).

Comparing statistically the two classes, progress is observed in both groups at the pushups motor skill test, and analyzing them between them, we find insignificant differences P>0.05 in the initial and intermediate tests and significant differences in the final tests P<0.01 (Table 6).

**Conclusions**

In motor skill tests, the experiment class ranked higher than the control class with significant values between them. In the initial testing, there were no significant differences in

the four tests performed, both girls and boys, starting somewhat from the same level of training. In the intermediate test, girls and boys get significant differences only in 30m sprint running and 5x10m shuttle run test. The final test comes with significant values in all tests, concluding that the means used in the lessons were beneficial to motor skill development.

During the physical education lessons by applying different contents to the experiment class allowed us to approach a progress of the obtained results. In the intermediate test a difference can be observed from the initial test, while in the final test the results are detached in favor of the experiment class.

In order to combat sedentary lifestyle, physical exercise must be practiced in all its forms both in an organized setting and in free time.

*References:*

1. Baștiurea E. (2014). *Handbal – aspecte teoretice privind capacitatea motrică specifică posturilor de joc.* Galați: Zigotto, p. 97-105.

2. Budevici-Puiu A., Carp I. (2015). *Abordarea măiestriei pedagogice prin prisma specialistului din domeniul educaţiei fizice şi sportului.* În: Probleme acmeologice în domeniul culturii fizice (Proiectul Instituţional): materialele conf. şt. intern. Chişinău: S. n., p.8-13.

3. Cojocariu A. (2010). *Fundamentele teoretice ale educaţiei fizice şi sportului.* Iași: Pim. 274 p.

4. Danail S., Ambrosie I., Suruciuc B. (2016). *Conceptul programei de pregătire pe etape cu orientare profesional-aplicativă.* În: "Sport. Olimpism. Sănătate.": Materialele Congresului Ştiinţific Internaţional, 5-8 octombrie, Chişinău: USEFS, Vol 1, p. 373-379.

5. Dumitru M. (2011). *Educaţia fizică componentă a curriculum-ului naţional (teorie şi metodică).* Constanţa: Ovidius University Press, p. 72-73.

6. Ene M.I., Paraschiv C.C. (2013). *Refacere-recuperare prin activităţi de loisir-fitness*: caiet de activităţi applicative. Galaţi: Editura Fundaţiei Universitare "Dunărea de Jos".

7. Filip C. (1999). *Sistemul naţional şcolar de evaluare la disciplina educaţie fizică şi sport.* Braşov: Imprimeriile Media Pro.

8. Ghervan P. (2014). *Teoria educaţiei fizice şi sportului.* Suceava: Univesitatea "Ştefan cel Mare", p. 30.

9. Guzun A. (2012). *Testele şi normele motrice constituie o necesitate sau o „sperietoare"?* În: Teoria şi Arta Educaţiei Fizice în Şcoală, nr. 4, p. 10-13.

10. Hanţiu I. (2013). *Teoria şi metodica educaţiei fizice şi sportului* (note de curs). Oradea: Universitatea din Oradea, p. 58-64, 71-74.

11. Leuciuc F.-V. (2010). *Musculaţie.* Suceava: Universitatea Ştefan cel Mare. 11 p.

12. Leuciuc F.-V. (2012). *Aprofundare într-o ramură sportivă: Handbal.* Suceava: Universitatea "Ştefan Cel Mare". 39 p.

13. Manolachi V., Moroşan I. (2014). *Particularităţile implementării metodei antrenamentului în circuit în cadrul lecţiilor de educaţie fizică din clasa a IV-a.* În: Teoria şi arta educaţiei fizice în şcoală, 1, p. 45-49.

14. Rus C. (2010). *Pentru profesorul de educaţie fizică şi sport.* Iaşi: Universităţii "Alexandru Ioan Cuza", p. 42-58.

15. Şerbănoiu S., Tudor V. (2013). *Teoria şi metodica educaţiei fizice şi sportului.* Curs universitar. Bucureşti, p. 74.

16. Triboi V. (2014). *Teoria educaţiei fizice şi sportului* (curs universitar). Chişinău: USEFS. 65 p.

17. http://legislatie.just.ro/Public/DetaliiDocument/224975, (accesat 04.02.2021)