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Original article

IMPROVING THE SPEED OF 9-10-YEAR-OLD CHILDREN THROUGH A PROGRAM OF GAMES AND RELAYS SPECIFIC TO HANDBALL, APPLIED IN THE PHYSICAL EDUCATION LESSON OVER A 12-WEEK PERIOD

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Abstract

Aim. Play is necessary in education, it satisfies children's need for movement. Students accumulate useful information by playing, which forms them as adaptable people in society. By applying a program of handball-specific games and relays in physical education lessons over a period of 12 weeks, we aim to improve the speed of 9-10-year-old children.

Methods. Experimental strategy implementation period was 12 weeks during March and June 2024. The research was conducted on 3rd grade students. The students were divided into two groups, an experimental group consisting of 20 students aged 9.08±1.66 and a control group consisting of 20 students aged 9.12±1.87. Both groups underwent a pre-test and a post-test. The tests were carried out under similar conditions, and there were 3 tests:

1. Shuttle test on 5 x 5 m – travel speed
2. Adams test - speed of exécution
3. Jump Rope Test – repetition speed

The experimental group included in the period between the 2 tests, a program of games and relays selected by us, which also contained elements specific to the game of handball. This program was applied during the physical education class, in the fourth grade, twice a week, for 15 minutes each. Study took place in the Sports Hall of Secondary School 18 "Jean Bart" from Constanta, with the size of 30m/15m.

Results. After applying the program designed by us, we managed to significantly improve the results of the 3 tests applied to the subjects in the experimental group compared to the control group, statistically proving that the program was effective because the difference is significant $p<0.05$ in two of the tests, and in the third difference was significant at $p<0.0005$.

Conclusions. The hypothesis of the research was confirmed, by applying a program of games and relays specifically from the game of handball in physical education lessons for a period of 12 weeks, it is possible to improve speed in children aged 9-10 years.

Keywords: Speed, games and relays, handball, physical education.

Introduction

Play is necessary in education, it satisfies children's need for movement. Students accumulate useful information by playing, which forms them as adaptable individuals in society. The interest and involvement of the students, in the Physical Education and Sport class, is becoming more and more difficult to gain, considering that the little ones are attached to the gadgets, which capture their attention and make them forget about how important and movement is beneficial for the body. Play is necessary in education, it satisfies children's need for movement. Students accumulate useful information by playing, which forms them as adaptable individuals in society. "Through its specific features, the game of movement differs from other means of physical education due to the fact that it favors the formation and simultaneous consolidation of basic motor skills (walking, running, jumping, throwing and catching), the development of motor qualities (speed, resistance , strength and skill), as well as moral-volitional attributes and skills" (Păcuraru, 2019). Competition, an element that increases students' interest in the activity, mobilizes their forces and stimulates their ideas, which makes movement games one of the most important and irreplaceable elements of a physical education teacher.

Objectives

By applying a program of handball-specific games and relays in physical education lessons over a period of 12 weeks, we aim to improve motor quality and speed in 9-10-year-old children. If we apply a program of games for a period of 12 weeks in the physical education and sports classes, surely the students will be receptive, they will have fun and the teacher will achieve his objective, improving motor quality, speed, namely the speed of movement, speed of execution, speed of repetition.

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Methods

Experimental strategy implementation period was 12 weeks during March and June 2024. The research was conducted on 3rd grade students. The students were divided into two groups, an experimental group consisting of 20 students aged 9.08±1.66 and a control group consisting of 20 students aged 9.12±1.87. Both groups underwent a pre-test and a post-test. The tests were carried out under similar conditions, and there were 3 tests:

1. Shuttle test on 5 x 5 m – travel speed

Description: from the top start position (from the feet), at an individual signal, the student will perform a speed run back and forth (shuttle), 5 times, over a distance of 5 m.

Methodology: the teacher will start the timer at the first movement of the student's leg and stop the timing when he crosses the finish line with his chest. During the commute, the instruction is for the student to cross the line marked on the ground with both feet. 2 attempts are given, at an interval of 15 minutes. The best result in seconds will be recorded in the record sheet.

Resources: running lane 5 m long, on flat ground, marked at both ends, with parallel lines 1 m long. The field will be cleaned before the test, in order to avoid any injury. At the ends of the running lane, an additional distance of at least 2 m to any obstacle will be required, so that the student can return from running safely.

2. Adams test - speed of exécution

Description: Draw 2 intersecting lines, 1 m long, and number the 4 spaces created, top with 2 and 4, bottom with 1 and 3. The performer starts from space 1 with a jump on two feet, jumping in the order of the numbers, with the goal of making as many jumps as possible in 15 seconds. Touching the line or not touching the ground with both feet is considered a mistake, successful jumps are counted and related to those that were wrong.

3. Jump Rope Test – repetition speed

Description: A suitable space is chosen for jumping with the rope (using both legs) and when the students are ready, they will jump in turn for 30 seconds without stopping while the teacher counts and notes how many jumps the student performed in 30 s.

The experimental group included in the period between the 2 tests, a program of games and relays selected by us, which also contained elements specific to the game of handball. This program consists of 8 games and 8 relays and was applied during the physical education class, in the fourth grade, twice a week, for 15 minutes each. The school curriculum provides for 3rd grade students 2 hours of physical education per week, in total there were 24 hours, each hour we used 2 games and 2 relays according to table no.1. Study took place in the Sports Hall of Secondary School 18 "Jean Bart" from Constanta, with the size of 30m/15m.

Table No. 1. Application program of games and relays

Application program of games and relays			
DAY 1,9,17	Relay race 1,2	Game nr. 7,8	Each relay was completed 3 times, with a 30 sec break. Each game was applied 2 times with a 30 sec break.
DAY 2,10,18	Relay race 3,4	Game nr. 5,6	Each relay was completed 3 times, with a 30 sec break. Each game was applied 2 times with a 30 sec break.
DAY 3,11,19	Relay race 5,6	Game nr. 3,4	Each relay was completed 3 times, with a 30 sec break. Each game was applied 2 times with a 30 sec break.
DAY 4,12,20	Relay race 7,8	Game nr. 1,2	Each relay was completed 3 times, with a 30 sec break. Each game was applied 2 times with a 30 sec break.
DAY 5,13,21	Relay race 3,4	Game nr. 5,6	Each relay was completed 3 times, with a 30 sec break. Each game was applied 2 times with a 30 sec break.
DAY 6,14,22	Relay race 1,2	Game nr. 7,8	Each relay was completed 3 times, with a 30 sec break. Each game was applied 2 times with a 30 sec break.
DAY 7,15,23	Relay race 7,8	Game nr. 1,2	Each relay was completed 3 times, with a 30 sec break. Each game was applied 2 times with a 30 sec break.
DAY 8,16,24	Relay race 5,6	Game nr. 3,4	Each relay was completed 3 times, with a 30 sec break. Each game was applied 2 times with a 30 sec break.

Relay race

1. Race in circles

Field: sports hall; a starting line is drawn for each team. In front of the lines, circles are drawn in a zigzag pattern, equal in number for each team, with a diameter of 0.50 m and a distance of 1 m.

Participants: the entire class group divided into two equal teams. The game starts at the signal: the first student from each team moves by jumping on one leg from circle to circle and returns by jumping on the other leg. The student who reaches first earns his team a point. The ranking is made according to the number of points accumulated by each team. (https://ro.scribd.com/document/610438082/jocuri-de-miscare-si-stafete-A5)

2. The relay with jumping from circle to circle

Field: sports hall; a starting line is drawn for each team. In front of the lines, 6 circles with a diameter of 0.50 m and a distance of 1.50 m are drawn in a zigzag pattern.

Participants: the entire class group divided into 4 teams, seated behind the starting lines.

The game starts at the signal: the first student of each team moves by jumping with landing on both feet or on one foot, from one circle to another. Having passed through all the circles, he runs back past the circles, touches the palm of the next one who continues the race, and he passes behind the column. Those who step on the lines of the circles or run outside them are penalized. The team that completed the route faster and has fewer penalties wins. (https://ro.scribd.com/document/610438082/jocuri-de-miscare-si-stafete-A5)

3. The relay of the 4 circles

Field: sports hall

Materials: chalk. Participants: the entire class group, divided into two equal teams, seated in a column in front of the starting line. In front of each team, four circles (with a diameter of one meter) are drawn on the ground at a distance of 4m from each other; at the signal, the first student from each team runs and goes around the first circle, in the second one in a sitting position, in the third one he performs five jumps in place, and in the fourth one he completely bypasses it by running backwards, after which he returns to the team running in a zigzag among the four circles. The team that finishes the route first wins. (https://ro.scribd.com/document/610438082/jocuri-de-miscare-si-stafete-A5)

4. Shuttle

Field: sports hall

Participants: the entire class group, divided into two numerically equal teams. "Shuttle" 3x5m (running with a turn every 5m) and handing over the baton. The team that finishes the race first wins. (https://ro.scribd.com/document/610438082/jocuri-de-miscare-si-stafete-A5)

5. The ball in the press

Field: sports hall

Materials: handballs. Participants: the whole group of the class, the Relay, by organizing the group into four groups of equal numbers, placed two by two, on the two sides of the field, in pairs. Hanging from the arm (the other arm bent behind the back), behind the middle line of the handball court, the ball supported with the head and shoulders "ball in the press", transporting the ball to the finish line (handball goal). The first pair to reach without dropping the ball wins.

6. Relay race

Field: sports hall

Materials: handball balls, hoops. The students are placed in a row on 2 columns. Each row contains an equal number of students. 3 m in front of each row there are 5 stakes (1.5 m apart from each other), and 2 m after the last stake, there is a circle. The first students in the row each have a handball.

At the start signal, the first students in each row start running with the ball in hand in a straight line; running between milestones; running with the ball in hand to the hoop; leaves the ball in the circle and starts running in a straight line, to his own line, where he passes the baton to the next colleague. The student who starts without the ball first runs in a straight line to the circle, collects the ball, then runs in a straight line; running between milestones; running in a straight line; passing the ball to the next colleague in line. The team that finishes the route first wins.

7. Relay race

Field: sports hall

Materials: Handball balls, goalposts, hoops, cones.

The students are placed in a row on four columns, in equal numbers. 2m in front of the first player in each column, there are 4 circles arranged in a zigzag pattern. 2 m from the last circle, on the ground, is a handball. At 4 m from the ball, from 0.5 m to 0.5 m there are 5 goalposts. And after the last milestone, 3 m away from it, a cone is placed.

At the teacher's signal, the first student in each row starts running to the circles, which he traverses by jumping from one foot to the other, runs to the ball he picks up from the ground; runs between the goalposts with the ball in hand, continues running, bypassing the cone and resuming the exercises in the opposite direction. After he leaves the ball on the ground, from where he picked it up, he jumps from both feet in circles and then passes the baton to the next colleague in line. The team that finishes the route first wins.

8. Relay race

Field: sports hall

Materials: cones

Students are placed in a row on four columns, in equal numbers. In front of the first player in each column, 4 meters away, a cone is placed, and then a second cone 4 meters away. The first player runs the distance to the first cone, returns to the starting line, steps on it with one foot, turns and runs to the second cone, then returns to the starting line and passes the baton to the next player. The team that finishes the route first wins.

Games

1. Who jumps more times?

Field: sports hall

Participants: the whole group of the class.

Materials: skipping ropes, one for each student or one for 5 students. The game starts at the signal: the students who have ropes start the jumps and everyone counts their executions.

If a student makes a mistake, he no longer jumps, but waits for the stop signal; this is how the student who performed the most jumps is determined.

2. Jumping sparrows

Field: sports hall

Participants: the whole group of the class.

A circle with a diameter of 6-8m is defined on the playing field. Inside the circle sits a child (the eagle) with the role of catcher. The other children ("sparrows"), scattered around the circle, enter and leave the circle jumping on two legs, chased to be caught by (the eagle), but only inside the circle. The "eagle" is not allowed to go outside the circle. The child touched by the "eagle" is considered caught. The "sparrow" caught by the "eagle" becomes the "eagle" (catcher). If the "eagle" does not manage to catch any "sparrow", after a time appreciated by the leader of the game, the respective child is replaced by a "sparrow".

3. Chickens run to the hatch

Field: sports hall

Participants: the entire group of the class. A child is chosen who will play the role of "fox". The place where all the grouped children will sit - the "chickens", the direction of running towards the place where the teacher is - the "closca" will be determined. When the "fox" appears, the "chicks" run to the "closca" to avoid being caught. At each repetition of the game: the place of the "chicks", the direction of travel and the "fox" will change. (https://www.scribd.com/document/136229321/Teste-Pentru-Dezvoltarea-Vitezei)

4. Rabbit hunting

Field: sports hall

Materials: handballs. Participants: the entire group of the class. Six players (hunters) are placed on the edge of the field, three on one side, three on the other side facing each other. The other players (rabbits) must run across the field without being hit by the hunters. The player who manages to get through without being touched wins. (https://www.scribd.com/document/136229321/Teste-Pentru-Dezvoltarea-Vitezei)

5. Countries (catching the ball)

Field: sports hall

Materials: a handball. Participants: the entire group of the class. The children form a circle and each receives a country name. Another player is placed in the middle of the circle, the leader of the game, who throws the ball up and shouts a country name. The player who received the name of the respective country must run in the circle and catch the ball before it touches the field. The players who caught the ball correctly the most times win. (https://www.scribd.com/document/136229321/Teste-Pentru-Dezvoltarea-Vitezei)

6. Who arrives first

Field: sports hall

Participants: the entire class group, divided into groups of 10 students. The students are seated in a circle, at a distance of 2m from each other; another runs around the circle and, at one point, hits one of the students with his hand; the one touched leaves the circle and runs in the opposite direction; the first to reach the Games of movement and relays the remaining free place wins, and the other continues the game in the same way. (https://www.scribd.com/document/136229321/Teste-Pentru-Dezvoltarea-Vitezei)

7. Fight with the points

Field: sports hall

Participants: the entire class group, divided into two equal teams. The group of students is divided into two teams placed in parallel rows, at a distance of 20m. At the teacher's command, the last ones from each team run as fast as they can and sit in front of their row. The one who arrives faster gets points, respectively the line that "ran" all the players wins.

8. The hunt

Field: sports hall.

Materials: handballs. Participants: the entire group of the class. Three hunters are chosen, the rest of the group spreading out over the entire field. The three must hit as many players as possible with the ball. They are allowed to pass and take a maximum of three steps with the ball. Players touched by the ball are out of the game. Two balls can also be used. (https://www.scribd.com/document/136229321/Teste-Pentru-Dezvoltarea-Vitezei).

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Results

Table No. 2. The results of the experimental group and the control group at the initial test and the final test

Grup	Exp. Grup (n-=20)		Control grup (n-=20)		Exp. Grup (n-=20)		Control grup (n-=20)		Exp. Grup (n-=20)		Control grup (n-=20)	
TEST	Shuttle test on 5 x 5 m (sec)				Adams test 15s (number of repetitions)				Jump Rope Test 30s (number of repetitions)			
	T.I.	T.F.	T.I.	T.F.	T.I.	T.F.	T.I.	T.F.	T.I.	T.F.	T.I.	T.F.
M±DS=	5,59± 0,476	5± 0,497	5,69± 0,607	5,67± 0,54	47,25 ± 8,967	48,9± 8,902	47,3± 8,986	46,9± 7,232	39,85± 7,836	45,25± 8,528	40,05± 7,708	40,6± 7,323
CV%=	8,515%	9,94%	10,668 %	9,9%	18,978 %	18,204 %	18,998 %	16,474 %	19,664 %	18,846 %	19,246 %	18,037 %
"t"student dependent (p)	8,483 (p<0.0005)		(p>0.005)		2,929 (p<0.005)		(p>0.01)		4,477 (p<0.0005)		(p>0.05)	
"t" student independent (p)	2,889 (p<0.005)				1,95 (p<0.05)				1,85 (p<0.05)			

*M, average; DS, standard deviation; CV, variability coefficient; n, number of subjects.

The experimental group, following the application of the proposed program, registered a statistically significant progress, from the initial testing to the final testing, in all 3 tests that check: speed of execution, repetition and movement.

Next, we will appreciate the value of the indicators of the chosen student population. Thus, in an experimental group, in which the development of speed was desired and a games program was applied during 12 weeks, the subjects were tested initially and finally, then the difference between the initial and final averages was statistically calculated. Fisher's table represented the support point with the help of which the obtained value was verified from the point of view of statistical significance.

Discussions

The results obtained by the experimental group at the final test, compared to the initial test, are significantly better ($p<0.0005$) in the Shuttle test and Jump Rope Test, and in the Adams test the difference is significant $p<0.005$. In all three tests applied to the control group, there are no significant differences between the initial and final testing.

Comparing the results obtained by the experimental group and the control group, in the two tests, a significantly better difference $p<0.005$ is observed in the Shuttle test and a significantly better progress $p<0.05$ in the Adams test and Jump rope test.

Potop (2019) proposes in his work, the development of the motor quality - speed, capitalizing on it through the physical education lesson, using other methods and means than the classic ones, with different impact from a psychological and social point of view, these being movement games, which can influence the child in a positive way. The study demonstrates the effectiveness of movement games in the psychomotor development of students from primary school - 3rd grade. In the study, participated 51 students, they were divided into two groups: an experimental group with 25 students and a control group with 26 students. The final recommendations were: choosing the means from movement games, this even becoming a priority, but also trying to change the students' perception of physical activity.

Chelaru & Popescu (2020), highlighted aspects related to the level of development of primary school students (4th grade), as well as how speed can be developed, in an attractive way, i.e. by introducing movement games in physical education lessons. It was observed that the height and weight of the 4th grade students can influence the improvement of the resulting speed and the introduction of movement games in the experimental class led to a more significant increase in the results compared to the control group. It was noted that the easiest way to acquire a technical method is to use games in the didactic activity, motivating this idea, starting from the premise that games are a priority for children at this age.

Constantin & Chirazi (2019) Approve the idea that by using movement games in the 4th grade in physical education and sports lessons, it is possible to learn the game of handball faster. The hypothesis was demonstrated by using movement games in the experimental classes at each lesson, at different moments of it and for various purposes.

Conclusions

Following the application of a program of handball-specific games and relays in physical education lessons over a 12-week period, we can say that speed can be improved in 9-10-year-old children. The hypothesis proposed by us for this study was confirmed by the results obtained by the experimental group compared to the control group, for all the proposed

samples. By carefully selecting games and relays, speed can be developed in a fun and attractive way in physical education and sports classes, using many dynamic games. These will stimulate the students' spirit of competition, train their relational capacities, therefore develop them both physically and mentally.

Informed Consent Statement: Informed consent was obtained from the School where the study was conducted and from all the parents of the subjects involved in the study.

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