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The effectiveness of the reciprocal method of speed and agility exercises in developing the starting speed and scoring accuracy of junior handball players at the specialized school

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Abstract

The purpose of this paper is to study was concerned with researching a very important physical characteristic as it is many sporting activities and according to the requirements of each activity, which is speed. The importance of the research is evident in trying to enhance and develop the ability to speed among junior handball players in the specialized school, leading them to a state of vital performance characterized by speed. The problem of the research lies in the weakness of possessing speed capabilities and how to employ them for different situations among most junior players. Accordingly, the study aimed to prepare reciprocal speed exercises with agility to work on enhancing and developing the ability to speed among junior players and the accuracy of scoring, in addition to knowing the extent of the impact of these exercises in enhancing and developing the ability to speed among junior handball players in the specialized school. The researcher assumed that reciprocal speed exercises with agility have a positive impact in enhancing and developing the ability to speed among junior handball players and developing their accuracy of scoring. The research sample was represented by a group of junior handball players affiliated with the specialized school in Najaf Al-Ashraf. After preparing and applying the exercises, the researcher concluded several points, the most important of which are: The experimental group achieved Progress compared to the control group in the tests (Speed and agility) by completing the specified distance in less time. The researcher recommended several recommendations, the most important of which are: The need for those in charge of education and training processes to pay attention to identifying the principles and foundations that would develop physical and motor capabilities to achieve the goals.

Keywords: Assessment, sprinter, start block

Introduction

Many countries are witnessing progress in the areas of life, and we find them giving physical education great and effective attention in the training process, whose goals are not limited to the cognitive aspect only, but rather extend to physical and motor capabilities and skills, as well as the type of activity practiced, in addition to the multiplicity of the trainer's approaches to training, taking into account the correct diagnosis of the skill and how to develop it according to the studied scientific methods to bring the players to a level of correct, successful and capable performance.

It is also no secret that physical exercises have a significant impact on the development and improvement of many physical and motor capabilities and abilities, including speed and agility, which directly affect the performance of players in general and handball players in particular. Handball is one of the games that has received and continues to receive great attention in various countries, and such attention has made specialists always seek to develop the game by raising the levels of players, as handball is one of the exciting and beloved games for young and old, due to its wide popularity if we want to compare it with other sports because of the excitement and speed of movement it carries, which made those concerned call

it the game of multiple talents, as is the case in football, for example, and this requires a high acquisition of physical capabilities, including motor speed, and here lies the importance of the study in employing some speed exercises in exchange with agility to enable the player to acquire the necessary speed in skill performance according to the various situations he is exposed to in the match.

Research Problem

The researcher is a former player and practitioner of handball, as well as a coach and supervisor of training sessions at the specialized school for handball for juniors in Najaf Governorate. He noticed that there is a problem in the weakness of possessing special speed capabilities among most of the junior players in that school, which indicates a state of deficiency in performance, especially in forming quick counterattacks, which causes a lack of investment in those attacks and thus wastes the opportunity to achieve a goal for the team. Therefore, the researcher decided to study this problem and try to enhance and develop the players' levels in terms of speed and agility, in addition to emphasizing the accuracy of scoring and reaching a stage where they can perform at the required speed and achieve the goal.

Research Objectives

- Preparing reciprocal speed exercises with agility to enhance and develop the speed, agility and scoring accuracy capabilities of junior handball players in the specialized school.
- Knowing the extent of the impact of reciprocal speed exercises with agility in enhancing and developing the

speed, agility and scoring accuracy capabilities of junior handball players in that school.

Research hypothesis

The reciprocal exercises between speed and agility have a positive effect in enhancing and developing the capabilities of speed (Rebound and launch), agility and scoring accuracy among junior handball players in the specialized school.

Research fields

Human field

Junior players aged (12-15) years who represent the specialized school handball team for the sports season 2021-2022.

Time field: The period from 15/10/2021 to 25/2/2022

Spatial field

The handball field for training the specialized school team in Najaf Governorate (Al-Majd Elementary School).

Research methodology and field procedures

Research methodology

One of the most important determinants that determine the research methodology used is the nature of the problem that the researcher wants to study and the purpose is to reach the best results based on scientific foundations that contribute to achieving the objectives. Therefore, the researcher chose the experimental method by designing two equivalent experimental and control groups (with pre- and post-tests) to suit it and the nature of the research problem.

Table 1: Shows the experimental design of the research sample

Group	Pre-test	Experimental Treatment	Post-Test
Experimental group	Speed test, agility test, and scoring accuracy test	Independent variable: Interval training between speed and agility	Speed test, agility test, and scoring accuracy test
Control group	Speed test, agility test, and scoring accuracy test	The trainer's training style	Speed test, agility test, and scoring accuracy test

Research community and sample

The researcher defined his research community as young handball players aged (12-15) years who represent the specialized handball school team in Najaf Governorate for the sports season 2021-2022, numbering (30) players.

The researcher also selected the research sample using a simple random method and by lottery from the original research community, which consists of (20) players, so that the percentage of the sample is (66.6%), as all sample members are subject to tests that the researcher will perform

in the research procedures to reach the desired results of this study.

Homogeneity of the research sample

Before implementing the tests, the researcher verified the homogeneity of the sample members for the purpose of controlling the variables affecting the research results (for all members of the research sample through some variables related to physical and morphological measurements such as height, mass and training age) as shown in the table below:

Table 2: Shows the homogeneity of the sample members in some variables

Statistical means	Unit of measurement	Arithmetic Mean	Standard deviation	The mediator	Coefficient of skewness
Variables	Cm	152.8	2.6	151.6	0.88
Height	Kg	48.13	4.3	46.75	0.92
Mass	Month	32,6	6,3	32,3	-0,288

From observing the results of the previous table, it becomes clear to us that the values of the skewness coefficient fall between (+_1), which indicates the homogeneity of the research sample individuals in the variables that were measured and which are influential in the homogeneity of the sample.

Methods, devices and tools used in the research

Methods used in collecting data

The most important methods used by the researcher to collect

data and information are the following:

- Observation
- Personal interviews (Appendix (1))
- Tests and measurements
- Arabic sources and the Internet

Devices and tools used in the research

- Laptop type (hp)
- Video cameras number (sony) number 1
- Electric medical scale number 1

- Chinese-made stopwatch.
- Data storage memory number 1.
- Indicators number (10), handballs number (10), iron squares.
- Legal handball field.
- White paint to define lines, whistle number (2).

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- Legal handball court.
- White paint to define lines, whistle number (2).
- Field research procedures

Determining the tests used in the research after surveying some sources related to tests and measurements and through interviewing experts and specialists, the researcher chose two tests to apply to the research sample in the experimental and control groups with the aim of measuring the speed and agility capabilities. These tests include the following:

A (30) meter running test from a moving start. (Muhammad Subhi Hassanein, 2004 AD, p. 292) ^[1].

Purpose of the test: Measuring speed.

Test description

After drawing three lines on the ground, the distance between the first and second lines is (10 m) and between the second and third (30 m), the player starts from the first line and upon reaching the second line, the stopwatch

starts to calculate the time it takes to reach the third line.

Recording method

The time taken by the tested player to cover a distance of (30 m) from the second line to the third line is recorded.

Zigzag running between the signs (zigzag). (Muhammad Subhi Hassanein, p. 281) ^[1]

Purpose of the test: Measuring agility.

Test Description

After placing five markers on the ground, the distance between them is (3 m), a line is drawn (3 m) from the first one, which is the starting line for the launch, where the player launches from it as quickly as possible after hearing the whistle associated with the stopwatch. The important thing is that the running here is between the markers (zigzag).

Recording Method

The time taken by the tested player to cover a distance of (30 m) back and forth is recorded after completing the circle around the last marker.

Shooting test from a standstill (Jamil Qasim Muhammad Al-Badri, Ahmad Khamis Radi Al-Sudani, 2011 AD, p. 272) ^[2]

The objective of the test: Accuracy of shooting from the support.

The tools used: (2) handballs, (4) iron squares 40 x 40 cm hanging at the corners of the target.

Performance Method

- The player stands behind a (7) meter throw line holding the ball.
- When the signal is given, the player shoots at square (1), then (2), then (3), then (4).
- The performance is repeated again.

Conditions

- The player's feet must be stable and not moved during the throw.
- The ball is played within three seconds of the start of hearing the audio signal.

Recording

One point is awarded for each shot inside the designated square and (zero) for a shot outside the square.

- Zero is awarded for the shot if the player commits a legal violation such as moving his other foot or not shooting within (3 seconds).
- The total score represents the tester's overall accuracy scores, which range between (zero-8) points, as in Figure 4.

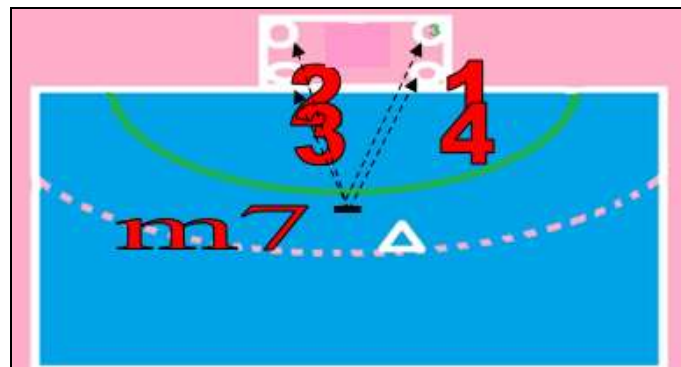


Fig 1: Shows the shoulder-level shooting test

The exploratory experiment: The exploratory experiment is a mini-experiment for the main experiment and must meet the same conditions and circumstances as the main experiment, whenever possible, in order to take its results" (Wajih Mahjoub, 2000 AD, p. 123) [3].

In order to identify the negative and positive issues that the researcher will face, he conducted his exploratory experiment on Friday, 12/11/2021, in the handball court for the specialized school's training at ten o'clock in the morning. It was conducted on (5) players (from outside the research sample). The goal of conducting this experiment was as follows:

- Knowing the time taken to conduct the test
- The validity and efficiency of the devices and tools
- Distributing the tasks of the assistant work team (Appendix (2)).

Table 3: Shows the arithmetic means and standard deviations for the two research groups in equivalence (pre-)

Statistical parameters tests	Experimental group		Control Group		Calculated T Values	Type of Significance
	Mean	+ Standard deviation	Mean	+ Standard deviation		
Speed test (second)	4.96	0.23	5.01	0.18	0.78	Non-sig
Agility test (second)	9.23	0.72	9.10	0.84	0.49	Non-sig
Scoring accuracy test (degree)	5.3	0.59	5.6	0.64	1.03	Non-sig

Degree of freedom (18) at a significance level of 0.05, (t) Table 2.1.

It is clear from Table (2) that all the calculated T values for the speed and agility tests are less than the tabular value of (2.1) at a degree of freedom (18) and a significance level of (0.05), which confirms the equivalence of the two groups in the tests used in the study.

Main research experiment) Application of speed and agility exercises (Appendix 3)

- The total number of units (24) units at a rate of three units per week.
- The experiment lasted (8) weeks, the total time for each unit was two hours.
- The time allocated for speed and agility exercises was 25%, i.e. about half an hour of the total time allocated for training, which was two hours.
- Speed and agility exercises were prepared by the researcher based on the observations and suggestions of the experts by conducting some personal interviews with specialists in handball, taking into account that these exercises are in line with the players' physical and skill capabilities.
- Under the direct supervision of the researcher, speed and agility exercises were implemented on the experimental research group, while the control group remained subject to the exercises in the training curriculum followed by the coach.
- A number of speed exercises were applied alternately with agility exercises within the time allocated for the training unit. The researcher was keen to implement these exercises at the beginning of the unit and immediately after the warm-up, as recommended by most experts, since developing speed and agility capabilities requires the player to be at full capacity and physically and psychologically prepared because they are classified as high-intensity central nervous system training in performance.
- The researcher began implementing the exercises on 21/11/2021, corresponding to Sunday.

- The extent of the players' readiness to conduct the test.

Pre-test

The researcher conducted the pre-test after all the conditions were met for it to be conducted on 19/11/2021 corresponding to Friday at exactly ten o'clock in the morning. It included the application of speed and agility tests in addition to the scoring accuracy test on the members of the research sample, as explained previously.

Equivalence of the two research groups

Through the results of the pre-tests for the variables under study, the researcher conducted equivalence between the control and experimental groups. Table (3) shows the results he obtained:

Post-test

In order to determine the level reached by the players and after completing the application of speed and agility exercises on the experimental sample, the researcher conducted the post-test for all members of the research sample in the control and experimental groups at ten o'clock in the morning on Friday 21/1/2022 on the handball court for the specialized school's training, taking into account following the same method of performance and providing the same conditions that were achieved in the pre-test in terms of time and place factors and devices and tools used.

Statistical methods used in the research

To reach the research results, the researcher used the SPSS statistical package for social sciences through the following statistical methods:

- Arithmetic mean.
- Standard deviation.
- Median.
- T-test for independent samples.
- T-test for correlated samples.
- Coefficient of skewness.
- Percentage.

Presentation, analysis and discussion of the results

This chapter includes presenting, analyzing and discussing the results of the two tests used in the research, which are (speed, agility and scoring accuracy test) for the experimental and control groups in both the pre-and post-tests. The (t) test was used to determine the significance of the differences between the control and experimental groups in the pre-and post-tests and to compare the calculated (t) value with the tabular (t) value. From the statistical results, the researcher had a sufficient amount of data on the results of the field experiment that he implemented on the experimental group. Accordingly, these results were presented in explanatory tables as follows:

Presentation, analysis and discussion of the results of the differences between the pre-and post-tests of the experimental group in the speed, agility and scoring accuracy tests

Table 4: Shows a comparison between the pre-and post-tests of the speed, agility and scoring accuracy tests for the experimental group

Statistical Parameters Tests	Pre-Test		Post-Test		Calculated T Values	Significance Level	Type of Indication
	Mean-	+ Standard Deviation	Mean-	+ Standard Deviation			
Speed test (Second)	4.96	0.23	4.16	0.25	7.13	0,00	Sig
Agility test (Second)	9.23	0.72	8.42	0.77	6.78	0,01	Sig
Scoring accuracy test (Degree)	5.3	0,59	8,03	0,86	14,36	0,00	Sig

Degree of freedom (9) at a significance level of 0.05, (T) table 2.62.

From Table 4 it is clear that the differences were significant between the pre-test and post-test in the speed and agility and scoring accuracy tests for the experimental group in favor of the post-test and were consistent with the time period in which the exercises were applied.

The researcher attributes the reason for the significant differences to the experimental group's test in applying speed and agility exercises, which are considered among the best exercises that work in the repetitive training method, especially since the handball player needs the capabilities of speed and agility throughout the match, and this contributes to investing any available opportunity to decide the positions in the match.

It is no secret to us that one of the most important determinants of a successful attack in handball is the optimal investment of a quick rebound after taking possession of the ball from the opponent, and this can only be achieved by raising the levels of speed specific to all team members. The coach must also know how the characteristic of speed is

linked to agility in most aspects of performance and playing situations that players are exposed to in order for all capabilities to contribute to adding fluidity and agility accompanying motor performance and thus increasing accuracy factors in various motor skills, especially with regard to scoring accuracy to decide the opportunity in favor of the team. This is what was confirmed "that accuracy is extremely important, whether for handling or shooting, requiring "neuromuscular coordination and complete control of the individual's neuromuscular system, and in most cases, the effective use of strength and speed is at the expense of accuracy, which means that their availability together is a highly required exception, which is what we see in players who reach an advanced level physically and skillfully" (Dhurgham Abdul Salem Nehme and Kamel Shanin Manahi, 2017, p. 294) ^[4], (Abdullah Hussein Al-Lami. 2004) ^[5].

Presentation and discussion of the results of the differences between the pre-test and post-test of the control group in the tests of speed, agility and scoring accuracy

Table 5: Shows a comparison between the pre-test and post-test of the tests of speed, agility and scoring accuracy of the control group

Statistical Parameters Tests	Pre-Test		Post-Test		Calculated T Values	Significance Level	Type of Indication
	Mean-	+ Standard Deviation	Mean-	+ Standard Deviation			
Speed test (Second)	5.01	0.18	5.03	0.45	1.13	0,08	Non Sig
Agility test (Second)	9.10	0.84	9.08	0.68	1.78	0,11	Non Sig
Scoring accuracy test (Degree)	5,6	0,64	6,5	0,78	3,26	0,02	Sig

Degree of freedom (9) at a significance level of 0.05, (T) table 2.62.

From observing the results in Table (5), it is clear that the differences were not significant between the pre-test and post-test in the speed and agility tests for the control group, while they were significant in the accuracy of scoring, depending on the time period in which the trainer's exercises were applied, but we see that the differences were small, as there was no noticeable development in the level of the control sample for the research, and the researcher attributes the reason to the sample's continued training on the trainer's method, and thus they maintained their level of speed and agility capabilities, as

most of the sample members are practitioners for a certain period, and therefore this practice reflects a state of multiple adaptations that also contributed to the emergence of slight differences in the control group in the level of accuracy of scoring resulting from the continuous repetition of performance.

Presentation and discussion of the results of the differences in the post-tests between the experimental and control groups in the tests of speed, agility and accuracy of scoring

Table 6: Shows a comparison between the post-test in the speed, agility and scoring accuracy tests for the two research groups

Statistical parameter Tests	Pre-test		Post-test		Calculated T values	Significance level	Type of indication
	Mean-	+ Standard deviation	Mean-	+ Standard deviation			
Speed test (second)	5.03	0.45	4.16	0.25	7.13	0,00	Sig
Agility test (second)	9.08	0.68	8.42	0.77	6.78	0,01	Sig
Scoring accuracy test (degree)	6,5	0,78	8,03	0,86	14,36	0,00	Sig

Degree of freedom (18) at a significance level of 0.05, (T) Table 2.1 We note in Table 6 that all differences were significant in the post-test in speed and agility for the experimental and control groups and in favor of the experimental group. The reason for the superiority of the experimental group over the control group is due to the use of reciprocal exercises between speed and agility during their implementation in the training units, which led to an improvement in the levels of speed and agility. This indicates that the use of training methods stemming from the repetitive

training method is one of the best means of improving the components of special speed and agility in all games and handball in particular. These exercises and the way they are performed contributed to raising the levels of speed of performance with the ball for the players significantly because they were performed according to their capabilities and special desires and taking into account the cases of fatigue that accompanied them while performing these exercises. Therefore, their exercises were continuous and for effective periods, which contributed to making changes in the positive

direction that ensures the continuation of fast performance at various times and situations of the match.

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Appendix 1

Names of experts who were interviewed personally

Expert name	Academic title	Specialization	Affiliations
Dr. Fadhel Kurdi Al Shammari	Professor	Psychology-Handball	College of Physical Education, University of Kufa
Dr. Ghassan Mohammed Abdul Sada	Assistant Professor	Management-Handball	College of Physical Education, University of Kufa
Dr. Ahmed Kazem Abdul Karim	Assistant Professor	Training-Handball	College of Education for Girls, Department of Physical Education
Dr. Hassanein Abdul Kadhim Fairouz	Lecturer Doctor	Training-Handball	College of Physical Education, University of Kufa
Dr. Haider Abdul Wahid Jaloub	Lecturer Doctor	Training-Handball	College of Physical Education, University of Kufa
Mr. Sami Kamouna	-	Najaf Education Handball Team Coach	Directorate of Education of Najaf Governorate
Mr. Kazem Kamel Fairouz	-	Najaf Governorate Handball Team Coach	Directorate of Youth and Sports of Najaf Governorate

Appendix 2

Names of the support team

Name	Qualification or competence	Mission
Dr. Wael Abbas Abdul Hussein	Training-Gymnastics	Experience management
D. Muslim Muhammad Sabet	Training-Racket Games	Experience management
Mustafa Hussein	Physical education student	Player and equipment preparation
Jamal Hussein	Physical education student	Help with data dump

Appendix 3

Some speed and agility exercises used in the research

- Sprinting for a distance of (30 m).
- Running with the ball as fast as possible for a distance of (20 m).
- Sprinting for a distance of (40 m).
- Sprinting between the markers for a distance of (30 m).
- Sprinting for a distance of (60 m).
- Tapping the ball between the markers as fast as possible for a distance of (15 m).
- Sprinting for a distance of (30 m) with receiving the ball and scoring.
- Sprinting between the markers for a distance of (30 m) with receiving the ball and scoring.
- Sprinting with multiple balls after receiving.

Number of players (10) representing the experimental research sample

- The nature of the performance is very fast and in a successive manner, one player after another.
- The method used in applying the exercises is the repetitive training method.
- These exercises are at the beginning of the training unit with sufficient rest periods in between.
- These exercises should be implemented under the supervision of a specialized cadre to avoid injuries.
- The distance mentioned in the indicators exercises represents the total of the outbound and return trips.

Appendix 4 A model for speed and agility exercises within the training unit

Number of players: 10

Training unit time: 120 minutes Training stage: Special preparation

Exercise application time: (25-30) minutes

Speed and agility exercises (Included in the main section)	Time to perform one exercise	Totals (Repetitions)	Rest between sets	Rest between exercises	Notes
Fast start for a distance of (30 m)	8 second	4	15 Second	3 minute	Speed and agility exercise intensity (90-100%) That is, the exercises must be performed as quickly as possible.
Sprinting between the signs for a distance of (30 m)	12 second	4	30 Second	3 minute	
Fast start for a distance of (40 m)	10 second	5	25 Second	3 minute	
Run with the ball as fast as possible for a distance of (20 m)	12 second	4	30	3 minute	
Fast start for a distance of (30 m) while receiving the ball and scoring	12 second	5	20 Second	3 minute	
Fast, zigzag running between the markers for a distance of (30 m) while receiving the ball and scoring	14 second	4	30 Second		

Appendix (x)
Peachtree's Fth Experimental Simple and Fast Agility Exercises

