

Effect of a training program on the development of physical abilities in football goalkeepers

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ABSTRACT

The primary aim of this study was to find out the effect of a training program on the development of physical abilities in football goalkeepers. The current study was conducted on goalkeepers of the Academy of Espanyol Sports Club in the premises of Haifa Sports Club Stadium. The study was completed by the researchers within the timeline of May 2021 to August 2021. A total of 7 goalkeepers falling within the age group of 15-17 years were recruited as the sample participants for the study. Out of 7 goalkeepers, 5 goalkeepers were included in the primary experiment and 2 of them were excluded. The training program applied had a positive effect on the development of physical abilities in the football goalkeepers of the sample. Therefore, the authors recommend to use the training program presented in this study to improve physical abilities in football goalkeepers.

KEYWORDS

Training; Physical abilities; Football; Soccer; Goalkeepers

1. INTRODUCTION

In the modern era of technical advancement, the consistent work of sports authorities and researchers have created a better learning environment by the provision of training to the players using modern methods and using scientific methods. The training of the players planned and executed as per the scientific principles plays an important and essential role in raising the level of performance of the players as an individual and in the team.

Hence, the team of scientists and researchers search for the modern training methods that have positive impact on the performance of the players in the game. The differentiated training is one of these methods that have drawn attention in recent times. Differentiated training is characterized as one of the modern methods that raise the level of the player's muscular ability in a gradual manner to

reach the highest level of ability of the player or team, within the training unit or within a set of exercises. The physical abilities have the great importance in every sports especially in the game of football for raising the level of performance of the skills of the players (Zayer, 2022). A player cannot master basic motor skills at an independent level. Basic motor skills thereby effectively contribute in developing physical abilities among players and help them in raising their level of performance in the final game. Among the physical abilities, the muscular ability holds key importance in the game of football especially in the goalkeepers, in their goal keeping skills. Special physical qualities are a basic requirement for each of the team games, but they differ in different sports, according to the nature of the performances and requirements of each game, and these requirements must be met by the practitioners of this game so that they can progress in training and reach high levels (Sánchez et al, 2019).

The performance of a goalkeeper in the game of football greatly depends on the level of efficiency of the players in performing the basic skills. In addition to this, the whole output of the game relies on the movement of the player inside the field as per the different playing positions in the competitive games. Hence the team having goalkeepers with high physical abilities have more chances of victory and this this contributes to raising the level of the team. Hence, the present study was focused on developing physical abilities among goalkeepers in the game of football by using differentiated training method.

The primary aim of this study was to find out the effect of a training program on the development of physical abilities in football goalkeepers. In the current study, the researchers hypothesized that statistically significant differences would be found between the pre and post measurements of the experimental group in the physical abilities of soccer goalkeepers, in favor of the post tests.

2. METHODS

2.1. Design and participants

The aim of any research is to get the best solution of the research problem. With the same school of thought, the authors conducted an experimental study. The present study had a single group, pre-post experimental study design. The current study was conducted on goalkeepers of the Academy of Espanyol Sports Club in the premises of Haifa Sports Club Stadium. The study was completed by the researchers within the timeline of May 2021 to August 2021.

The research community for the study was determined by the intentional method. The process of the sample selection is one of the important steps for data collection. The study was conducted in the Espanyol Sports Academy. It has been evidenced that the sample participants in any research are the representatives of the original community, chosen by the researcher (Allawi & Radwan, 2000). Hence the sample selection was done in a very deliberate way. A total of 7 goalkeepers falling within the age group of 15-17 years were recruited as the sample participants for the study. Out of 7 goalkeepers, 5 goalkeepers were included in the primary experiment and 2 of them were excluded. The homogeneity of the sample was confirmed by comparing the baseline characteristics of the participants, using the law of the skewness coefficient (Khairy, 1970), as it is described in Table 1.

Table 1. Homogeneity of the research sample members

Variables	Unit	Mean	Median	SD	Skewness
Weight	kg	69.00	70.00	1.87	0.38
Height	cm	1.71	1.70	0.02	0.51
Age	Year	16.60	17.00	0.54	0.60
Training age	Year	3.00	3.00	0.70	0.00

2.2. Instruments

In the present study, many tools and devices were used for the purpose of data collection with the aim to achieve the objectives of the research. The various tools used in the present study included a camera, CD, legal footballs, measuring tape, obstacles of different sizes and heights of 50 cm, a box with a height of 25 cm, whistle, stopwatch, and a laptop.

The first test: Foot speed test

This test was performed with the intent to measure the kinetic speed of the feet. The tools required for conducting this test included a stopwatch and a whistle. The goalkeeper was asked to stand at the starting point. After hearing the start signal, he was directed to move his right foot and perform the movement, in a way that the entire foot crosses the right line and the foot is

perpendicular to the line. Followed by this he was directed to return with the same foot to the starting point and move the left foot to perform the movement

The second test: Special moves of goalkeepers 8 m x 20 times

This test was performed with the intent to measure the goalkeeper's own endurance outside the goal area. The test was conducted in half a soccer field. The tools required for conducting this test included 3 footballs - a stopwatch - a whistle - 3 nets to carry the ball. For this test, the goalkeeper was asked to stand behind the starting line. After hearing the start signal, he was asked to run runs against the inside of the field to touch the ball initially with both hands, then back to the starting point, then run against the ball and then with both hands, then back and back to the starting point, then run to touch the ball. Followed by this he was directed and return and run to touch the ball (3) and return and repeat. Every time the goalkeeper was asked that the balls fixed on the boundary of the line must be touched. The test performance time is recorded to the nearest 1/10 of a second (Darwish, 2002).

The third test: Defending with the arm on the side (Darwish, 2002)

This test was performed to measure the kinetic velocity of the arm. The tools required for conducting this test included a stopwatch, football, and 2 nets to carry the ball. At the start of the test, each participant was asked to stand in the direction facing the field while keeping the right hand on the ball. After start signal, participant was asked to move the arm as quickly as possible to touch the lower ball and then move quickly to touch the top ball. During performance of the test the participants were directed to touch the ball alternatively and their feet must remain fixed on the ground during the performance. Each goalkeeper had one attempt. The performance continues for 20 seconds. The total number of times each ball was touched was documented (Darwish, 2002).

The fourth test: Speed of defense of the foot

This test was performed to measure the kinetic speed of the foot during defense (constriction and relaxation of the thigh muscles). The tools required for conducting this test included soccer goal, stopwatch, soccer ball, whistle and net to carry the ball. At the start of the test, each participant was asked to stand in the direction facing the field while keeping the instep of the right foot facing the ball. After start signal, participant was asked to move their right foot to touch the ball and return quickly and repeat. During the performance of the test, the participants were asked to keep their left foot stable. Their foot must return to its place after touching the ball, the ball must be touched with

the foot. Only one attempt was given to each participant. The performance continued for 20 seconds. The total number of times, each ball was touched was documented (Darwish, 2002).

The fifth test: Leap to the side to defend with the arm

This test was performed to measure the muscular capacity of the legs. The tools required for conducting this test included a tape measure and a chalk. At the start of the test, each participant was asked to stand in the direction facing the wall. Participants were asked to raise their right arm to the side to a maximum distance and make a mark with chalk on the line drawn on the wall. Followed by this they were asked to jump to the right side taking the form of defense and then make a mark on the line drawn on the wall at the maximum distance they reach after jump. Participants were directed to keep their feet fixed to the ground without raising the heel while placing the mark on the wall. Each participant was provided with three attempts. The best score of the three attempts was documented (Darwish, 2002).

2.3. Procedures

The exploratory experiment was conducted in the month of May 2021 on the goalkeepers of the Espanyol Sports Club Academy at Haifa Sports Club stadium. The preliminary experiment was conducted with the aim to determine the dimensions of the location of the camera, when performing video shooting of the basic skills of goalkeepers, to verify the validity of the tools used in terms of positive assistance, to verify the fitness of the tests for the tester members and the ease of their application, to know the time required to conduct the tests, to verify the understanding and efficiency of the assistant work team in conducting measurements and tests and recording the results, to know the difficulties that the researcher may encounter during the course of the study.

The pre-tests were conducted in the month of May 2021. The training program was appropriate for the age of the sample participants of the research, proportional to the degree of load in the training in terms of intensity and volume, and the exercises were guided by the results of the exploratory study in order to determine the starting dose and the duration of the training period.

After completing the pre-tests for physical abilities, the researcher prepared and organized training units using the exercises for the football goalkeepers. The training program was successfully implemented with two training units per week. A total of 20 training units were included in the present study. The differentiated exercises were implemented in the main section of the training unit only. The total time for each training unit was two hours. The training load used in the exercise program was 80-95%. When developing the exercises, the researchers relied on the principles of

sports training and other sciences, as well as the opinions of a group of experts and specialists in the field of sports training.

After accomplishment of differentiated method of training, the post-tests were conducted in the month of July 2021. The post-tests were conducted under the same conditions in which the pre-tests took place, in terms of the assistant work team, the place, the time, and all the tools and devices used in the implementation of the tests.

2.4. Statistical analyses

In the present study, the statistical analysis was carried out using the Statistical Package for the Social Sciences (SPSS) version 24. The researchers calculated arithmetic means, standard deviations and t tests.

3. RESULTS

Table 2 shows the results of pre and post-tests in the research tests of the research sample. The table 2 illustrated that the arithmetic mean and standard deviation scores of the foot speed test in the pre-test were 10.20 and 0.44 and in the post test were 12.40 and 0.54, with t value of 3.50 and p value of 0.02. As the t value was found to be lower than 0.05, the difference was significant in favor of the post-test.

The arithmetic mean and standard deviation scores of the test of special moves of goalkeepers in the pre-test were 15.20 and 1.05 respectively and in the post test were 13.79 and 0.87 respectively, with calculated t value of 4.01 and p value of 0.01. Then, the significant difference was found in favor of the post-test.

The arithmetic mean and standard deviation scores of the test of defending with the arm on the side in the pre-test were 58.80 and 1.64 respectively and in the post test were 60.00 and 1.87 respectively, with t value of 3.22 and p value of 0.03, at $p=0.05$ level of significance. The significant difference was found in favor of the post-test.

The arithmetic mean and standard deviation scores of the test of speed of defense of the foot in the pre-test were 65.20 and 2.28 respectively and in the post test were 66.60 and 3.04 respectively, with calculated t value of 2.92 and p value of 0.04, at $p=0.05$ level of significance. The significant difference was found in favor of the post-test.

The arithmetic mean and standard deviation scores of the test “leap to the side to defend with the arm” in the pre-test were 24.20 and 3.50 respectively and in the post test were 36.40 and 4.02

respectively, with calculated t value of 4.35 and p value of 0.01, at p=0.05 level of significance. The significant difference was found in favor of the post-test.

Table 2. Results of pre and post-tests in the research tests of the research sample

Tests	Unit	Pre-test		Post-test		t	Difference between arithmetic means	Difference between standard deviations	p
		Mean	SD	Mean	SD				
Foot speed test	Number of times	10.20	0.44	12.40	0.54	3.50	2.2	0.1	0.02
Special moves of goalkeepers 8 m x 20 times	Second	15.20	1.05	13.79	0.87	4.01	1.41	0.18	0.01
Defending with the arm on the side	Number of times in 20 seconds	58.80	1.64	60.00	1.87	3.22	1.2	0.23	0.03
Speed of defense of the foot	Number of times	65.20	2.28	66.60	3.04	2.92	1.4	0.16	0.04
Leap to the side to defend with the arm	Distance/cm	24.20	3.50	36.40	4.02	4.35	12.2	0.52	0.01

4. DISCUSSION

The findings of the present study revealed that significant differences were obtained on comparison between pre-test and post test scores of all the test variables in favor of post-tests. The training units significantly contributed in raising the level of the performance of the goalkeepers in the game of football. In previous literature it has been evidenced that a player's physical and tactical preparation is of no value without motor skills (Gerges, 1985).

The significant findings indicated that the prepared exercises were appropriate to the level of the research participants, were built on correct scientific foundations, and were implemented properly by the training coaches and the players. In addition to this, these exercises included more than one physical attribute at one time during the performance. The importance of the exercises lies in preparing the body for the skillful preparation and bringing it to automatic compatibility. This leads to the success of the training program in achieving the goal for which it was set in developing the skills of players. The significant results were also attributed to the diversity of the exercises. Jabar & Jari (2021) in their study stated that diversity in exercises, especially exercises with a competitor, helps to increase speed and accuracy.

Under the research sample and its characteristics, the method used, the tests and measurements used, the available capabilities, and in light of the goals, assumptions and tools, and through the

results of the statistical analysis of the data, the researchers concluded that the training program applied had a positive effect on the development of physical abilities in the football goalkeepers of the sample.

According to the conclusion adopted and formulated by the researchers from the results obtained in this experiment, some recommendations were made by the researchers. The authors recommend to use the training program presented in this study to improve physical abilities in football goalkeepers. They also suggest to carry out similar studies in different samples in terms of age and gender.

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All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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