

# The effect of maximum speed training at different distances on the anaerobic capacity and scoring accuracy of soccer players

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## ABSTRACT

The aim of this study was twofold: firstly, to prepare exercises aimed at enhancing maximum speed at varying distances for soccer players. Secondly, to investigate the impact of maximum speed training at different distances on the anaerobic capacity and scoring accuracy of soccer players. The researchers employed an experimental approach with two equivalent groups in both the pre-test and post-test phases for both the experimental and control samples. The research community comprised players from the Football Development Club, totaling 30 players. A random selection process was utilized to choose a sample consisting of 20 players. This sample was then divided into two groups: the experimental group, consisting of 10 players, and the control group, also consisting of 10 players. For statistical analysis, researchers used the SPSS program. There were significant differences between the results of the post-tests of the research variables of the control and experimental groups and in favor of the experimental group. The positive results attained by the players of the experimental group in anaerobic ability stemmed from the exercises they employed, which facilitated the enhancement of this ability.

## KEYWORDS

Maximum Speed; Different Distances; Athlete

## 1. INTRODUCTION

The development of sports sciences has become very advanced, as it moved from the descriptive nature to the pure sciences due to the large number of scientific results that has been obtained from research and scientific studies in sports, and most of them are from information about developing and improving the ability of the coach to understand the effects that physical exercises put on the body of the individual athlete. Therefore, physical exercise in itself is the main point in

order to achieve the main goal of sports training, which is to raise the level of sports achievement to the highest possible level. In this context, it is important an organized, purposeful and scientifically oriented educational process towards preparing athletes in different stages and levels (Sánchez García et al, 2019; Mannaa et al, 2023).

Football game is one of the team games that need a long time in order for the player to reach the high level of sports, so attention must be paid to training according to modern and scientific training programs on an ongoing basis, in terms of the physical aspect of the players, and in terms of skill, and the football game is one of the collective and competitive games that depend on the speed of performing basic and tactical skills, and this comes through the physical speed acquired by the players, and that most teams and sports teams have a weakness in speed training of all kinds, and speed is a very important physical ability during the current period, since the football game depends on speed in implementing basic skills and modern plans (Hadi AlAridhee et al, 2023).

Speed training must be diversified because re-training the speed in the same way leads to building a fixed form of movement and thus leads to the stability of speed and its non-development as a barrier to speed is built so different training for speed must be put in place, including training with different distances, and that this method differs from one athlete to another, it is very important and needed by the player being It is closely linked to the nervous and muscular systems, and has proven its importance in many team games, and its development contributes to the development of sports development of the individual and compound skills and plans as soon as possible according to the correct movement paths, and through this the importance of research has emerged in identifying speed training at different distances for soccer players (Prieto Valle, 2020; Ridha Ali, 2023).

Besides, the research problem is presented as follows: The changes in the game plans and the requirements of the effectiveness of the match, as well as the academic, international and training experience of the two researchers being teachers in the College of Physical Education and Sports Sciences in team games and looking at studies and scientific research in sports training. Football training units that contribute to the development of basic skills significantly, which prompted the researchers to solve this problem. Moreover, the research aims at the followings: firstly, preparing exercises for maximum speed at different distances for soccer players.

Secondly, identifying the effect of maximum speed training at different distances on the anaerobic capacity and scoring accuracy of soccer players. The research hypotheses are clarified as follows: as for the first hypothesis, it is as follows: there are statistically significant differences between the pre and post-test and in favor of the post-test for the experimental and control groups in the anaerobic capacity and scoring accuracy of soccer players. Whereas the second one is presented

as follows: there are statistically significant differences between the two post-tests of the control and experimental groups and in favor of the experimental group in the anaerobic ability and scoring accuracy of soccer players.

## 2. METHODS

### 2.1. Study design and participants

The researchers employed an experimental approach with two equivalent groups in both the pre-test and post-test phases for both the experimental and control samples.

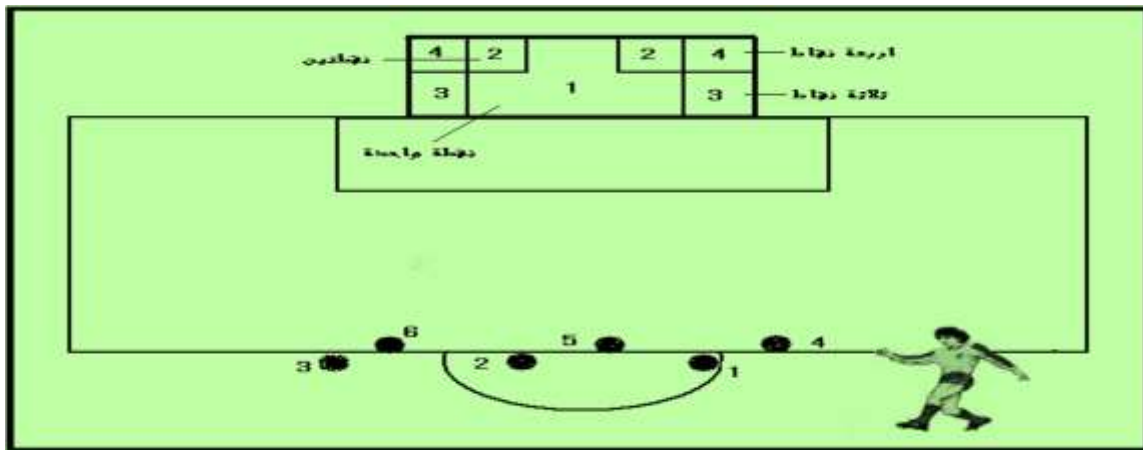
The research community comprised players from the Football Development Club, totaling 30 players. A random selection process was utilized to choose a sample consisting of 20 players. This sample was then divided into two groups: the experimental group, consisting of 10 players, and the control group, also consisting of 10 players. Additionally, four injured players were excluded from the exploratory experiment, resulting in a sample percentage of 0.66, which represents the most accurate representation of the community. The study was conducted at the Al Tatweer Sports Club Football Stadium in Baghdad, from March 4, 2022, to June 22, 2022.

### 2.2. Procedures

The researchers used the following materials: soccer balls (10), computer (Lenovo), 4 colored sticky tapes, electronic stopwatch, 6 squares for accuracy testing, 3 whistles, and one medical scale for measuring weight.

The researchers identified the tests that are related to the required skills, as they are experienced and specialized in the field of sports training and physiology in team games:

1. Anaerobic capacity test: Vertical jump test to measure anaerobic power (Radwan, 1998).
2. Testing the accuracy of aiming at the target (Hammad, 1994) (Figure 1).



**Figure 1.** Measuring the accuracy of aiming at the target

The exploratory experiment was conducted on a sample of 6 players and they were randomly selected, as they were excluded from the main experiment. Its purpose was to know the suitability of the physical and skill tests for the research sample members, to know the time that it takes to perform each test, to ensure the validity of the tools and devices used in the tests, and to train auxiliary work team to conduct or implement the experiment.

The researchers conducted the pre-tests before applying the training curriculum, where the tests took place on Sunday 17/04/2022, as the functional tests and skill tests took place on the same day. After conducting the pre-tests, the program was applied, consisting of 6 weeks, with two training units per week. The curriculum was applied with speed training at different distances. Post-tests were carried out on Sunday 05/06/2022. The researchers fixed the conditions for the tests in terms of place, time, method of testing and the work team in order to achieve the same or similar conditions as much as possible when conducting post-tests for the research sample.

### 2.3. Statistical analyses

The statistical analyses were carried out with the Statistical Package for the Social Sciences (SPSS), version 24. With SPSS, the researchers calculated means, standard deviations and t tests. Statistical significance was set at  $p < 0.05$ .

## 3. RESULTS AND DISCUSSION

Table 1 presents the differences between pre-test and post-test in the control group. Table 2 presents the differences between pre-test and post-test in the experimental group. Table 3 presents the differences between the post-tests of the control and experimental groups. Both control and experimental groups significantly improved their anaerobic capacity and their scoring accuracy, but the improvements of the experimental group were significantly higher than those of the control group.

**Table 1.** Differences between pre-test and post-test in the control group

Variables	Pre-test		Post-test		t	p
	Mean	SD	Mean	SD		
Anaerobic capacity	113.3	2.35	113.6	2.09	2.95	<0.05
Scoring accuracy	3.12	1.05	4.21	1.33	4.12	<0.05

**Table 2.** Differences between pre-test and post-test in the experimental group

Variables	Pre-test		Post-test		t	p
	Mean	SD	Mean	SD		
Anaerobic capacity	114.12	1.45	114.95	1.3	3.15	<0.05
Scoring accuracy	4.91	1.02	5.14	1.12	4.02	<0.05

**Table 3.** Differences between the post-tests of the control and experimental groups

Variables	Control group		Experimental group		t	p
	Mean	SD	Mean	SD		
Anaerobic capacity	114.95	1.3	113.6	2.93	3.35	<0.05
Scoring accuracy	5.13	1.12	4.21	1.33	4.2	<0.05

Table 3 showed that there are significant differences between the results of the post-tests of the research variables of the control and experimental groups and in favor of the experimental group. Between the post-tests of the experimental and control groups, the application of the members of this group and their implementation of maximum speed exercises at different distances led to the occurrence of these differences. Speed is one of the main components of physical fitness and it is important to succeed in many sports. For some athletes, such as running athletes, swimmers and runners their results depend on speed. Speed is the most important aspect of their physical fitness including team sports. Some of the sports that focus on speed include football, tennis, boxing, martial arts, and others (Cherappurath et al, 2023; López García et al, 2020; Radhouane et al, 2023).

The real goal of the training applied by the research sample is to develop the level of maximum speed, which the experimental group was training on in its curriculum, and this is an indication of improving their physical and physiological efficiency, and that the scientific training program proposed by the researchers based on organized planning has developed speed. The experimental group was able to achieve the highest rate of speed and anaerobic ability, as well as the accuracy of football scoring, by emphasizing the implementation of running steps with an ideal ratio between their length and frequency, which was determined from the follow-up exercises of this group. The researchers believe that the maximum speed is a characteristic of the utmost importance, so the coaches must focus on the development of speed. The maximum speed that an individual can perform in a movement is not only related to the level of development of speed, but also related to other elements such as force dynamics, motor precision, and technique control.

#### 4. CONCLUSIONS

The positive results attained by the players of the experimental group in anaerobic ability stemmed from the exercises they employed, which facilitated the enhancement of this ability. Similarly, the positive outcomes observed in the football scoring accuracy of the experimental group players were attributed to the exercises they practiced, which contributed to the improvement of this skill. Furthermore, these exercises introduced an element of suspense and excitement, preventing boredom among the players. Considering these results, the authors recommend maximum speed training at different distances to improve anaerobic capacity and scoring accuracy of soccer players. Finally, it would be recommendable to carry out similar studies in other sports.

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#### **AUTHOR CONTRIBUTIONS**

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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