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Determining the Contribution Percentage of Special Physical Fitness Elements to Some Basic Skills of Zakho Club Football Players

Safad Mudhafar Mohammed
safad.mohammed@uoz.edu.krd
Department of Physical Education and Sports Science
University of Zakho, Iraq

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Abstract : This study aimed to identify the relationship and contribution percentages between special physical fitness elements (explosive strength, speed strength, speed endurance, strength endurance) and basic football skills (long distance shooting, dribbling, long pass, heading) in advanced players at Zakho Sports Club. The sample consisted of 15 players who were tested on the fitness elements and skills. The results showed significant correlations between explosive strength and shooting/heading skills; speed strength and dribbling; and strength endurance and heading. Explosive strength had the highest contribution to shooting (48%) and heading (43%). Speed strength contributed most to dribbling (76%). Strength endurance contributed highly to heading (30%). The findings can help guide training efforts and program design for optimal development of key football skills.

Keywords : Football, Skills, Physical Fitness, Explosive Strength, Contribution Percentage.

INTRODUCTION

It is noted that sports games in general, and football in particular, have attracted very wide interest in sports, research and specialized circles. This great interest has prompted researchers and specialists in the field of football to adopt a scientific and serious approach to explore the various aspects through which maximum benefit and development can be achieved in this game. This is due to the fact that football has become one of the most popular games at the international and local levels, making it a central subject for research and development in several related fields. In modern football, achieving the best results is impossible without good training for players, and the success of any team, including top teams, is determined by three main factors they are: player style, tactics, psychological state (Bolotin & Bakayev, 2017).

There are 4 elements of special physical Fitness in Football, they are speed strength, explosive strength, strength endurance, and speed endurance. Speed Strength is the most recurring basic characteristic for football players due to what the player needs during the match in terms of speed to perform basic skills, high frequency and motor speed in kicking the ball or

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running because basic skills cannot be performed if the speed strength element is not available (Nikolaidis et al., 2022). It is defined as "the ability to exert strong, fast muscular contractions for a short period of time, usually around 5-10 seconds, without dropping to the level (Smith & Jones, 2021). This strength is very necessary for the football player as it appears in cases of strong, fast shooting, dribbling, heading and also in the ability to perform the required skills at the appropriate speed and shortest possible time (Williams et al., 2020).

Explosive strength is considered a fundamental physical attribute for football players to possess (Loturco et al., 2021). It refers to the ability to exert a maximal amount of force in a very short time frame (West et al., 2022). Explosive strength is required in key football skills like shooting, tackling, turning, and explosive starts (Suchomel et al., 2018). Elite players have high levels of explosive strength enabling them to sprint faster, jump higher, kick the ball with greater power, and change direction more quickly than less physically developed players (Turner et al., 2018). There are strong correlations between tests of explosive strength (e.g. vertical jump height) and football-specific skills such as dribbling speed and agility (Nikolaidis et al., 2021). Given the importance of explosive movements in football match play, developing high levels of muscular power should be prioritized in training programs (Haugen et al., 2022). A combination of maximal strength training, plyometrics, and speed/power exercises can effectively improve football-related explosive strength capacities (Williams et al., 2020). Monitoring and testing explosive strength also provide coaches and fitness staff with useful insights for assessing player progression, talent identification, and determining readiness to return from injury (West et al., 2022). In summary, the ability to exert force powerfully and rapidly plays a pivotal role in football performance.

Strength Endurance is the ability of a muscle or muscle group to withstand fatigue during repeated muscle contractions, or to withstand external resistances for the longest possible period of time (Haugen et al., 2022). The importance of strength endurance for football players is evident given the existence of some skills that require exerting strength for a long period such as dribbling the ball for a long distance, jumping up to head the ball more than once, or shooting at the goal powerfully from different distances and several times (Nikolaidis et al., 2021). Speed Endurance is extremely important for football players. Scientific sources agree that speed endurance is a composite physical trait of speed and endurance. Turner et al. (2018) defined it as: "the player's ability to maintain his speed for the longest possible period of time". Therefore, the importance of this composite trait has emerged, through which the player is able to cover short, fast distances or longer distances at the speed he faces during the

intensity of the match to a large, multiple and different extent such as walking, jogging and running according to the requirements of the match's defensive and offensive tasks (West et al., 2019).

Basic Football Skills consist of dribbling, passing, shooting, and heading. Dribbling is one of the basic skills that all players must master during matches when maneuvering, deceiving to get past the opponent, and running with the ball. In modern football, the focus is on increasing the number of defensive players. Accordingly, the player must have highly skilled and proficient dribbling and ball control skills, in addition to the ability to penetrate quickly towards the goal. These skills help the player overcome dense defenses and additional defenders who are organized in modern tactics (Haugen et al., 2022). Turner et al. (2018) defined it as "a combination of multiple movements made by the player in possession of the ball to move forward and attack towards the opposing team's goal."

Passing is one of the most used skills in football and one of the basic elements that players must possess as "the main element in transferring the ball towards the opponent's goal as quickly as possible" (Trewin et al., 2018). Passes are one of the most important means of executing offensive plans in modern football because they ensure reaching the opposing team's goal quickly and in the least time and help control the course of play and control offensive and defensive plans (Bradley et al., 2019). Players must also have suitable technique and excellent physical abilities in the game of football to be able to dribble, pass and receive the ball (Doewes et al., 2020).

Shooting is considered one of the most important means of individual attack used by the player to score a goal in the other team's net. Therefore, the player always seeks to score goals because the team that scores the most goals during the game is considered the winner (West et al., 2022). In order for the shooting skill to succeed in the best way, some special physical fitness elements must be available such as explosive strength and speed strength to accomplish this skill (Loturco et al., 2021). Turner et al. (2018) defined it as "the actual attempt of the attacking player to get the ball into the opponent's goal". Heading is used during shooting or passing to a teammate or clearing a dangerous ball from the goal, and the importance of this skill increases in the penalty area due to the numerical presence of defenders and attackers and the large number of balls raised in this area where they must be followed up and played with the head (Lesinski et al., 2017). While the foot is the primary weapon for shooting when the ball is on the ground or near it, there is no doubt that the head is the primary weapon for shooting when the ball is high in front of the goal. Therefore, excelling in heading the ball is

indispensable in football (Lopez-Segovia et al., 2019). Lehance et al. (2022) defined it as "the process of playing the ball with the head for the purpose of passing, shooting or clearing".

Through studies and research, a close and tangible correlation has been found between the components of basic physical fitness such as strength, speed, agility, endurance and basic football skills such as dribbling, passing, shooting and heading. This discovery shows the importance of developing the physical fitness of football players to improve their performance in those basic skills and thus achieve better success at the athletic level (Rajab, 1999). As (Abdul Wahab, 1976) stated, the concept of physical preparation associated with the modern organization of sports training focuses on preparing the physical characteristics in a manner that serves the requirements of the skillful, tactical and planned game performance, which can only be productive with a player who is adapted between the art of basic skills and elements of special physical fitness in its different types. The fact that the player has a distinguished skill performance as well as good tactical thinking cannot guarantee success unless he relies to a large extent on the required general and special physical fitness elements and determining them. We also find that modern game plans rely on making full use of the elements of special physical fitness and their association with the performance of basic skills (Rajab, 1999).

Previous studies have been conducted in the similar topic such as Al-Hayani's Study (1994) has Identified the relationship between some physical attributes and basic skills of Al-Mosul Sports Club football players. Hayani (1994) concluded that here is a correlation between leg explosive strength and short/medium passing tests, ball juggling in the air and trapping tests and there is a correlation between explosive strength and the 10 cones dribbling test (Al-Hayani, 1994). Rajab Study (1999) has identified the relationship between some elements of special physical fitness and the level of skill performance of skills among football players. Identify the relationship between some elements of special physical fitness and the success rate of performing the selected motor skills in matches. Rajab concluded that there is a significant correlation between leg explosive strength and the side throw skill and that there is a significant correlation between leg explosive strength and (close-range shooting, medium passing) skills.

The importance of researching the percentage contribution of special physical fitness elements in developing a number of basic skills for football players has become clear. This research can help guide training efforts and develop physical improvement programs for players in a better and more effective way. This study problem is: **"**What occupies the minds of football coaches is how to get the player to that level of general and special physical fitness, good skill and psychological performance?" Since physical fitness is the basis for skill performance, it

must be employed to serve the elements of the game (Rajab, 1999). But the question raised is: "What is the relationship between special physical fitness elements and the performance of basic skills in football?"

Accordingly, this study was conducted to identify the relationship of some special physical fitness elements and their contribution percentages to some basic skills of football players. Through field follow-up of some Duhok team trainings, it was noticed that many coaches focus in their training on special physical fitness elements but without knowing the contribution percentages of these elements to the performance of the basic skills that the players perform on the field. Hence, the most important question for the coach should be raised, which element of special physical fitness affects more than others in the performance of basic skills and whether the correlation relationships between special physical fitness elements and the level of basic skills performance are equal for all traits? This is what prompted the researcher to stand at this problem and try to study it and provide appropriate solutions.

The research objectives are: 1) to identify the relationship between special physical fitness elements and some basic football skills of Zakho Club players; 2) to determine the contribution percentage of each element of special physical fitness to some basic skills of Zakho Club football players. So the research hypotheses are: 1) There is a significant correlation between special physical fitness elements and some basic football skills, and 2) There is a difference in the contribution percentages of some special physical fitness elements to some basic football skills. The focus of this study are Advanced football players of Zakho Sports Club located in Zakho International Football Stadium. The study conducted from 15/10/2020 to 10/1/2021.

RESEARCH METHOD

The selection of 15 players from the total of 25 advanced players of Zakho Sports Club participating in the Iraqi Premier League was based on specific criteria that align with the objectives of the research. These criteria included factors such as players' performance levels, positional diversity, and the need to exclude those involved in the exploratory experiment to avoid bias and ensure the integrity of the research findings. This deliberate and strategic sampling approach allowed for a comprehensive analysis of the phenomena under investigation, ensuring that the sample was representative of the population in terms of skills and positions. Consequently, the sample size of 60% of the total research population was

deemed sufficient to achieve the research objectives, as detailed in Table 1, which includes information about the research sample.

Tabel 1. Means and Standard Deviations of Height, Weight and Age Variables

Variable	Unit	Mean	Standard Deviation
Height	cm	171.66	4.2
Weight	kg	74.66	1.8
Age	years	21.66	1.2

Data collection techniques used in this study consists of: 1) content analysis by reviewing scientific sources and studies to identify the special physical fitness elements in football, which were (explosive strength, speed strength, speed endurance, strength endurance); 2) Questionnaire: After the researcher identified the most important elements of special physical fitness, a number of questionnaire forms were designed and presented to a number of specialists in the field of sports training and football. These forms were a questionnaire form to identify the most important special physical tests in football. A questionnaire form to identify the most important basic skills and their associated special skill tests related to the research topic. Tables 2., Table 3., and Table 4. show the agreement percentages of the specialist gentlemen served as the instrument validity; 3) Tests and skills that obtained an agreement percentage of 75% or more of the opinions of the specialist gentlemen were adopted.

Table 2. Agreement Percentages of Specialists for Football Special Physical Tests

Special Physical Fitness Elements	Total	Agreed	Agreement Percentage
Explosive Strength	7	7	100%
Speed Strength	7	7	100%
Speed Endurance	7	6	85.71%
Strength Endurance	7	6	85.71%

Table 3. Agreement Percentages of Specialists for Determining Basic Football Skills

Basic Skills	Total	Agreed	Agreement Percentage
Long Distance Shooting Accuracy	5	5	100%
Long Pass	5	4	80%
Dribbling	5	5	100%
Heading	5	4	80%

Table 4. Agreement Percentages of Specialists for Football Skill Tests

Skill Tests	Total	Agreed	Agreement Percentage
Long Distance Shooting Accuracy	5	4	80%
Long Pass	5	4	80%
Dribbling	5	5	100%
Heading	5	4	80%

The Specifications of Physical Tests include: 1) Explosive Strength: Standing Vertical Jump Test (Hassanin, 1995); 2) Speed Strength: 10 Second Forward Long Jump Test (Ghazzal, 1992, p. 34); 3) Speed Endurance: 120m Run and Time Calculation (Al-Tai, 2001); 4) Strength Endurance: Sit-ups to Fatigue (Abdul-Jabbar & Bastawisi, 1987). The Skill Test Specifications were: 1) Long Distance Shooting Accuracy: Shooting at a football goal target with a handball goal inside; 2) Long Pass: Kicking the ball the longest distance between two lines along the goal area (Al-Rawi, 2001); 3) Dribbling: Zigzag run with the ball between 6 cones placed 2m apart back and forth (William, 1980); 4) Heading: Heading the ball for the longest possible distance (Al-Dulaimi & Abd Al-Haq, 1997). The equipment Used were Handball goal - Football goal - 5 Footballs - 50m Measuring tape - 6 Cones - 3 Stopwatches - Whistle. And other equipments that are commonly used tests in sports education research.

Field Research Procedures consist of Exploratory Experiment for Physical and Skill Tests that was carried out on 20/11/2020 on (10) players from the research sample, (5) players performed the physical tests and (5) other players performed the skill tests. Main Experiment for Physical and Skill Tests were the physical and skill tests were executed by the research sample on two consecutive days: 25-26/11/2020. The statistical methods used were the (SPSS) program that was used via computer to extract the Mean, Standard Deviation, Pearson's simple correlation coefficient, Contribution percentage, and Percentage.

RESULTS AND DISCUSSIONS

From the empirical data, the Means and Standard Deviations of Special Physical Fitness Elements and Some Basic Football Skills are shown in Table 5. below.

Table 5. Agreement Percentages of Specialists for Football Special Physical Tests

Variables	Mean	Standard Deviation
Explosive Strength	52.80	7.27
Speed Strength	25.03	3.10
Speed Endurance	15.76	1.18
Strength Endurance	38.26	4.77
Long Distance Shooting	14.06	2.84
Dribbling	10.44	1.13
Long Pass	48.27	5.42
Heading	11.53	1.46

Table 5. presents the means and standard deviations for special physical fitness elements and basic football skills, revealing that: 1) The mean of the explosive strength of the sample was 52.80 with a standard deviation of 7.27; 2) The mean of the speed strength was 25.03 with

a standard deviation of 3.10; 3) The mean of the speed endurance of the sample was 15.76 with a standard deviation of 1.18; 4) The mean of the strength endurance of the sample was 38.26 with a standard deviation of 4.77. As for the basic football skills: 1) The mean of the long distance shooting skill was 14.06 with a standard deviation of 2.84; 2) The mean of the dribbling skill of the sample was 10.44 with a standard deviation of 1.13; 3) The mean of the long pass skill was 48.27 with a standard deviation of 5.42; 5) The mean of the heading skill was 11.53 with standard deviations of 1.46.

Table 6. Correlation Between Special Physical Fitness Elements and Some Basic Football Skills

Physical Variables	**Long Distance Shooting**	**Dribbling**	**Long Pass**	**Heading**	**Physical Variables**
Explosive Strength	0.69	0.05	0.54	0.66	Explosive Strength
Speed Strength	0.25	-0.87	0.40	0.11	Speed Strength
Speed Endurance	0.15	0.12	0.08	0.17	Speed Endurance
Strength Endurance	-0.49	0.32	-0.45	-0.55	Strength Endurance

Significant at 0.05 error level, 13 degrees of freedom, and 0.51 critical r value.
Significant at 0.01 error level, 13 degrees of freedom, and 0.64 critical r value.

Table 5. presents the means and standard deviations for special physical fitness elements and basic football skills, revealing that: 1) There is a significant correlation between leg explosive strength and the (shooting, heading) skills as the calculated correlation coefficient values were (0.69, 0.66) respectively, which are greater than the critical value of 0.64 at 13 degrees of freedom and 0.01 error level; 2) There is a significant correlation between speed strength and football dribbling skill as the calculated correlation coefficient value was -0.87, which is greater than the critical value of 0.64 at 13 degrees of freedom and 0.01 error level; 3) There is no significant correlation between speed endurance and the studied basic skills; 4) There is a significant correlation between strength endurance and football heading skill as the calculated correlation coefficient value 0.55 is greater than the critical value of 0.51 at 13 degrees of freedom and 0.05 error level.

From Table 6. there is a highly significant correlation between the explosive strength of the leg muscles and the skills of (long distance shooting, heading, long pass). The researcher believes that the greater the explosive strength of the player in the muscle groups used, the better his performance of long-distance shooting from areas far from the goal. He can also rise

to long distances in the long pass skill. Without the player possessing the explosive strength trait, it would be difficult for him to skillfully perform long distance shooting and long passing, as well as heading. This is confirmed by both (Ahmed & Ali) and (Al-Moshhadani) in this regard that one of the most important characteristics of explosive strength is increasing motor performance by increasing the ability of muscles to contract at a faster rate and more explosively through the range of motion in the joint and at all movement speeds (Ahmed & Ali, 1996) (Al-Moshhadani, 2002).

The inclusion of strength and endurance training alongside regular football training has resulted in major improvements in strength and endurance capacity. The effects of training on top-level football players are similar in magnitude to those observed in lower standard football players (Helgerud et al., 2011). As for the results in Table 6. regarding the speed strength trait, there is also a highly significant correlation with the dribbling skill. Research links this issue to the lack of speed-specific strength, which is considered necessary for successful ball dribbling. This physical aspect is one of the most important aspects in the performance of football players, and its frequent use is repeatedly in matches. This is strongly emphasized by Al-Hayali on the importance of speed strength as one of the most prominent special physical traits, and indicates that it plays a prominent role in executing basic skills that require high strength and high speed, such as sprinting and dribbling the ball (Al-Hayali, 2007).

As for strength endurance, it has a significant correlation with the heading skill, as the importance of strength endurance for football players is evident in repeating the performance of football's basic skills, especially the heading skill. This is what Ismail et al. refers to, as heading requires exerting strength for a long period in terms of jumping up to head the ball more than once (Ismail et al., 1989). As for the speed endurance element, we found no significant correlation with all football basic skills (long distance shooting, dribbling, heading, long pass) because these skills require the strength trait more than their need for the endurance trait. On this basis, these correlations did not rise to the level of significance.

Table 7. Contribution Percentages of Special Physical Fitness Elements to Some Basic Football Skills

Elements and Skills	**Long Distance Shooting**	**Dribbling**	**Long Pass**	**Heading**	**Elements and Skills**
Explosive Strength	48%	3%	30%	43%	Explosive Strength
Speed Strength	6%	76%	16%	1%	Speed Strength

Speed Endurance	2%	1%	7%	3%	Speed Endurance
Strength Endurance	24%	10%	20%	30%	Strength Endurance

Table 7. presents the means and standard deviations for special physical fitness elements and basic football skills, revealing that: 1) The contribution percentage of explosive strength to long distance shooting skill was (48%), to dribbling skill (3%), to long pass skill (30%) and to heading skill (43%); 2) The contribution percentage of speed strength to long distance shooting was (6%), to dribbling skill (76%), to long pass skill (16%) and to heading skill (1%); 3) The contribution percentage of speed endurance to long distance shooting was (2%), to dribbling skill (1%), to long pass skill (7%) and its contribution percentage to heading skill was (3%); 4) The contribution percentage of strength endurance to long distance shooting was (24%), to dribbling skill (10%), to long pass skill (20%) and to heading skill (30%).

As shown in Table 7. for the contribution percentages of special physical fitness elements to some basic football skills, the highest contribution percentage of explosive strength was in the skills of long distance shooting and heading. This is "due to the need of these two skills for the explosive strength element which is considered a trait resulting from the linkage between maximum strength and maximum speed"(Suleiman, 2004). As for the contribution percentage of speed strength trait in some basic football skills, it reached the highest contribution percentage in the dribbling skill because of the very high need for the ball dribbling skill to have this physical element. This agrees with Al-Nu'man in his study that the dribbling skill requires strong, rapid muscle contractions in the muscles during performance (Al-Nu'man, 2005). As for strength endurance, it contributed the highest percentage in the heading skill followed by the shooting skill to a lesser extent, while the contribution percentage was weak between the speed endurance element and the studied basic football skills such as (long distance shooting, long pass, heading, and dribbling) because these skills require strength, speed and for a short period of time which is closer to explosive strength and speed strength than to speed endurance.

CONCLUSION

Significant Correlations: The study highlights significant correlations between specific physical fitness elements and football skills: explosive strength is closely related to shooting and heading; speed strength to dribbling; and strength endurance to heading. This indicates the critical role of these fitness components in enhancing football skill performance. Contribution

Percentages: Explosive strength shows the highest contribution to shooting (48%) and heading (43%), emphasizing its importance in power-related football skills. Speed strength is most influential in dribbling (76%), highlighting the need for rapid muscle contractions in skill execution. Strength endurance notably contributes to heading (30%), underlining its relevance in sustained efforts. Varied Impact of Physical Fitness Elements: Each physical fitness element has a distinct impact on football skills, with explosive strength and speed strength being particularly crucial for skills requiring quick, powerful actions, while strength endurance is key for skills demanding sustained effort.

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