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A comparative study of the physical and technical characteristics of U15 football players based on their playing positions

دراسة مقارنة لبعض الخصائص البدنية والمهارية لدى لاعبي كرة القدم U15 حسب مراكز اللعب

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Abstract:

The study aims to examine the differences in physical and technical characteristics among U15 football players based on their playing positions. The researcher employed a descriptive approach with a sample of 36 players selected through a purposive sampling method. To gather data, a series of physical and technical tests were conducted.

The findings revealed no statistically significant differences in physical characteristics (transitional speed, Explosive power , and Agility) among the players according to their positions. Similarly, there were no statistically significant differences in skill characteristics, (Zigzag running while dribbling the ball., Kicking the ball for the longest distance., and Effectiveness of shots on goal, across different playing positions.

Keywords: Physical characteristics- skill characteristics- playing positions.

الملخص :

تهدف الدراسة إلى دراسة الفروق في الخصائص البدنية والمهارية لدى لاعبي كرة القدم U15 حسب مراكز اللعب، واستخدم الباحث المنهج الوصفي، على عينة قوامها 36 لاعب تم اختيارهم بالطريقة القصدية، ولجمع البيانات استخدم الباحث مجموعة من الاختبارات البدنية والمهارية.

وتوصلت الدراسة إلى عدم وجود فروق دالة احصائيا في الخصائص البدنية (السرعة الانتقالية، القوة الانفجارية للأطراف السفلية، المرونة) لدى أفراد العينة حسب مراكز اللعب، كما توصلت الدراسة إلى عدم وجود فروق دالة احصائيا في الخصائص المهارية (الجري المتعرج بالكرة، ركل الكرة لأبعد مسافة، دقة التسديد في المرمى) لدى أفراد العينة حسب مراكز اللعب.

- **الكلمات المفتاحية :** - الخصائص البدنية - الخصائص المهارية- مراكز اللعب.

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- **Theoretical chapter :**

*** Introduction and problematic of the study**

Football is regarded as the most popular sport in the world, both in terms of the number of players and the millions of fans who follow various continental and international tournaments and competitions. This popularity reflects the excitement and interest that the game generates, which has constantly evolved over time. It has transformed from a simple, accessible activity into a modern sport with high physical, technical, tactical, psychological, and mental demands. **(Sadouki Bilal, 2021, 463).**

The performance of a football team during a match relies on players effectively fulfilling their duties based on their assigned positions. Each position comes with specific responsibilities that align with the coach's chosen playing style. Additionally, each position demands particular physical and technical attributes from the player occupying that role. In this context, the suitability of a player for a position is crucial., **(chteoui Abdelmalek et al, 2018)** The specificity of a player's position is a crucial topic in football. A player's excellence in a particular position stems from their unique physical and technical characteristics, which align with the requirements and responsibilities of that position. Therefore, it is essential to understand these characteristics to effectively utilize a player's strengths and address their weaknesses during training. By focusing on the specific duties tied to each position, coaches can optimize performance and development.

Physical characteristics refer to the body's capability to endure the demands and requirements of work, the diverse paths it encounters in life, and its essential adaptation to fit circumstances and emergency situations. **(Kamal Abd elHamid, Mohamed Sobhi, 2004, p. 332)** It is defined as the healthy condition of an athlete regarding physical fitness, enabling him to use his body

skillfully and efficiently during physical and motor performance with the best effort and least fatigue. **(Ibrahim Hammad, 2001, p. 18).**

The researcher believes that a set of physical abilities enables players to perform tactical and technical tasks with minimal effort.

Skill characteristics in football encompass all the fundamental skills a player utilizes, both with and without the ball, in accordance with the game's rules. These skills, often referred to as basic motor skills, are executed with a high degree of accuracy. They are essential for successfully navigating the various situations that arise during a game, aiming to achieve optimal results while expending minimal effort. **(Sahraoui Mourad et al., 2014, p. 428).**

It includes all necessary movements performed for a specific purpose within the framework of football rules, regardless of whether these movements involve the ball. **(Nouiri Boubaker, 2018, p. 63)**

The term refers to the fundamental skills that a player executes within the rules of football. These skills largely depend on the efficiency of the neuromuscular system and are influenced by the player's physical attributes. Playing positions are designated areas on the football field where players are assigned according to a game plan. This arrangement ensures that roles are shared among players as they carry out their defensive and offensive responsibilities. **(chteoui Abdelmalek et al., 2018, p. 258).**

The researcher defines positions as locations along the field where players are situated during the match. The responsibilities and duties associated with each position vary from one to another.

Several previous studies have examined the variables relevant to this research, and we highlight the following:

A study conducted by Gober et al. (2020) titled "A Comparative Study of Some Physical Characteristics of Football Players According to Playing Positions"

aimed to identify the levels of specific physical characteristics based on playing positions, as well as to examine any differences in these characteristics among the positions. The sample included 30 players under the age of 19, and a descriptive research approach was employed.

The findings indicated that the overall level of physical characteristics among all players was average. While no significant differences were observed in the physical characteristics across different players, notable differences in strength were found, favoring defensive players.

The study conducted by Abdelmalek et al. (2018), titled "A Comparative Study of the Physical and Technical Characteristics of Football Players According to Their Playing Positions," aimed to identify the differences in the physical and technical traits of football players based on their positions on the field. The researchers employed a descriptive approach with a sample of 105 football players.

The study concluded that there were no significant differences in physical characteristics (aerobic endurance, explosive strength, transitional speed, agility, and flexibility) among the various playing positions. However, differences were noted in specific skills, including passing accuracy, shooting, and heading, depending on the players' positions.

A study conducted by Agoun et al. (2023), titled "A Study of Differences in Certain Physical Characteristics (Maximum Aerobic Speed, Explosive Strength) Among U21 Football Players According to Playing Positions," aims to identify variations in maximum aerobic speed and explosive strength among football players based on their playing positions (defense, midfield, and attack). The researchers employed a descriptive approach, analyzing a sample of 18 players under the age of 21.

The findings revealed significant differences in both maximum aerobic speed and explosive strength of the lower limbs when comparing players in different positions among those under 21 years of age.

Based on the information provided above, we can formulate the following general questions:

- Are there statistically significant differences in the physical and skill characteristics of football players under the age of 15 based on their playing positions?

This general question includes the following sub-questions:

- Are there statistically significant differences in the physical characteristics of football players under the age of 15 based on their playing positions?
- Are there statistically significant differences in the skill characteristics of football players under the age of 15 based on their playing positions?

As a temporary solution, we can propose the following general hypothesis:

- There are statistically significant differences in certain physical and technical characteristics of football players under the age of 15, based on their playing positions.

The following partial hypotheses support the general hypothesis:

- There are statistically significant differences in various physical characteristics of football players under the age of 15, depending on their playing positions.
- There are statistically significant differences in certain skill characteristics of football players under the age of 15, based on their playing positions.

The study aims to identify differences in specific physical and technical characteristics among football players under the age of 15, based on their playing positions. Additionally, it highlights the unique attributes required for each position in football (defense, midfield, and attack). Understanding these characteristics will assist coaches in recruiting and training players according to the specific needs of each position.

The practical chapter:

Exploratory study

The researcher conducted an exploratory study involving 15 players, from January 15 to January 25, 2024.

Study method: The researcher used a descriptive method.

Study sample: The study sample consisted of 36 football players under the age of 15, selected through a purposive sampling method. Goalkeepers and the exploratory sample were excluded from this group. The table below illustrates the distribution of the sample based on their playing positions.

Table 1: Distribution of sample individuals by their playing positions.

Playing positions	Number	total
Defense	14	36
Midfield	12	
Attack	10	

Source: Prepared by the researcher

Tools for Collecting Data and Information

Physical tests:

-30Metre Sprint Test with a 15-Metre Running Start to Measure Transition Speed:

The player begins at the first starting line, which is positioned 15 metres away from the second starting line. Upon hearing the starting signal, the player

sprints to reach maximum speed by the time they reach the second starting line. A timekeeper then records the time it takes for the player to cross the finish line. Each player is allowed two attempts to achieve their best time. **(Amr Allah Ahmed Al-Basati, 1995, pp. 288-229)**.

- **Horizontal Jump Test to Measure Explosive Strength in the Lower Limbs:**

A ruler marked in centimeters should be placed on the wall at a height of at least 4 meters, with the scale starting 1 meter above the floor. The player holds a piece of chalk and reaches as high as possible to mark the wall. Next, the player bends their knees and places one arm behind their back before jumping as high as possible, leaving a second mark on the wall. The distance between the first and second marks is measured and recorded to the nearest centimeter. The player is allowed three attempts, and the best result is recorded. **(Amr Allah Ahmad Al-Basati, 1995, pp. 219-221)**.

- **Forward Trunk Flexion Test for Measuring Flexibility:**

The player sits in a long sitting position with their legs straight out in front of them, ensuring that their feet are flat on the ground and touching a box. The player then bends their trunk forward while extending their arms out so that their palms reach over a ruler, which is placed 15 cm beyond the edge of the box. The player is allowed two attempts, and the highest distance that the middle finger of their palm reaches on the ruler is recorded**. (Ali Ayesh, Ghazi Hamada, 2008, p. 64)**.

Skill tests:

- **Zigzag Ball Run Test:**

In a 10x10 meter square, the player starts in a ready position with the ball in front of them. Upon hearing the signal, the player sprints with the ball, following

a designated figure-8 path. Each player has two attempts, and the best time from these attempts is recorded. **(chteouii Abdelmalek, et al., 2019, p. 260)**

- **Testing the Longest Kick:**

A 20-meter wide and 80-meter long area is marked out on the side of the pitch and divided by parallel lines. The first line, which is parallel to the goal line, is located 4 meters away. The ball is placed in the middle of this line. The player begins running from the goal line, starting 4 meters behind it, and then kicks the ball using any part of their foot. The distance from the starting line to the point where the ball lands is then measured. The player is allowed three attempts, and the best result is recorded**. (Ibrahim Shaalan, 2009, p. 521)**

- **Accuracy Test at the Goal:**

The player stands 20 meters away from the goal, which is divided into six sections. The goal has two central sections, with the upper central section worth 2 points and the lower central section worth 1 point. There are also two sections on each side, where the upper sections are worth 5 points and the lower sections are worth 3 points. Each player is allowed 5 shots with each foot**. (chteoui Abdelmalek, et al., 2019, p. 260).**

the scientific tools conditions

Validity and reliability:

To assess the reliability of the field tests utilized in this study, we administered the test to a sample of 15 players and then re-administered it after a 10-day interval. Following this, we calculated the Validity coefficient, the results of which are presented in Table 2.

Table 2: reliability Coefficient and Validity Coefficient for Field Tests

Field tests	reliability	Validity
Transitional speed	0.87	0.93
Explosive power	0.93	0.96
Agility	0.90	0.94
Zigzag running while dribbling the ball.	0.93	0.96
Kicking the ball for the longest distance.	0.91	0.95
Effectiveness of shots on goal	0.89	0.94

Source: SPSS outputs created by the researcher.

Table 2 indicates that the field tests utilized in this study demonstrate a high level of stability, with reliability coefficients ranging from 0.87 to 0.93. Additionally, these field tests show a strong degree of reliability, as evidenced by Validity coefficients that range from 0.93 to 0.96.

the application procedures on the ground:

After completing all necessary procedures and confirming the scientific basis of the study tools, we conducted the final research experiment over a span of two days. Day 1 consisted of physical tests, while Day 2 focused on skill tests.

Statistical methods used in the study:

To verify the validity of the hypotheses, the Statistical Package for the Social Sciences (SPSS 22) was used, employing the following statistical procedures: Shapiro-Wilk test, arithmetic mean, standard deviation, T-test, and one-way ANOVA.

Exposure , analyses and result exam

It is important to verify the normality of data distribution using the Shapiro-Wilk test before testing the hypotheses with various statistical methods. The results are shown in Table 3.

Table 3: Verification of the conditions for normal distribution for the variables under study.

Variables		Playing position	Statistics	ddl	sing
Physical tests	Transitional speed	Defense	0.97	14	0.879
		Midfield	0.924	12	0.316
		Attack	0.982	10	0.973
	Explosive power	Defense	0.949	14	0.549
		Midfield	0.906	12	0.191
		Attack	0.866	10	0.090
	Agility	Defense	0.939	14	0.345
		Midfield	0.919	12	0.276
		Attack	0.887	10	0.158
Skills tests	Zigzag running while dribbling the ball.	Defense	0.911	14	0.165
		Midfield	0.905	12	0.234
		Attack	0.987	10	0.992
	Kicking the ball for the longest distance.	Defense	0.948	14	0.533
		Midfield	0.919	12	0.275
		Attack	0.955	10	0.732
	Effectiveness of shots on goal	Defense	0.926	14	0.267
		Midfield	0.927	12	0.354
		Attack	0.897	10	0.076

Source: SPSS outputs prepared by the researcher

The results in Table 3 suggest that the data adhere to a normal distribution, as indicated by the non-significant results of the Shapiro-Wilk test across all field tests. Consequently, we can apply parametric tests for the statistical analysis of the data.

Presentation, analysis, and discussion of physical test results categorized by playing position.

Table 4 displays the mean and standard deviation of the physical characteristics of sample individuals categorized by their playing positions.

the physical characteristics	Playing position	A sample Volume	mean	standard deviation
Transitional speed	Defense	14	5.14	0.16
	Midfield	12	5.15	0.15
	Attack	10	5.10	0.13
Explosive power	Defense	14	19.78	1.42
	Midfield	12	19.33	1.77
	Attack	10	19.40	1.07
Agility	Defense	14	23.85	1.51
	Midfield	12	23	1.27
	Attack	10	23	1.41

Source: SPSS outputs prepared by the researcher

Table 4 shows that the arithmetic mean of the transition speed of the sample individuals according to playing positions (defense – midfield - attack) was (5.14 - 5.15 - 5.10) respectively, with the best result being for the attackers by a slight margin, while the arithmetic mean of the explosive strength of the lower limbs of the sample individuals according to playing positions was as follows (19.87 - 19.33 – 19.40), with the best result slightly in favor of the defense players. The arithmetic mean of the flexibility of the sample individuals according to their playing positions was as follows (23.85 – 23 – 23), with the best result in favor of the defense players.

Table 5: One-way ANOVA results of physical characteristics by playing position among sample individuals.

the physical characteristics	Variance source	Sum of squares	ddl	Mean squares	F value	Sing
Transitional speed	Between Groups	0.016	2	0.008	0.344	0.711
	Within Groups	0.759	33	0.023		
	total	0.774	35			
Explosive power	Between Groups	1.548	2	0.774	0.358	0.702
	Within Groups	71.424	33	2.164		
	total	72.972	35			
Agility	Between Groups	6.286	2	3.143	1.578	0.222
	Within Groups	65.714	33	1.991		
	total	72	35			

Source: SPSS outputs prepared by the researcher

Table 5 indicates that there are no statistically significant differences in physical characteristics specifically, (Transitional speed, Explosive power, and Agility) among individuals in different playing positions (defense, midfield, and attack). The values obtained for these comparisons were 0.344, 0.358, and 1.578, respectively, all of which do not indicate statistical significance.

The researcher suggests that the lack of differences in physical characteristics may be due to the fact that the participants in the study trained together using the same training program, without the coach considering the specific needs associated with each playing position. These findings align with those of chteoui Abdelmalek et al. (2019) and Omar Ibrahim (2012), both of which found no

significant differences in physical characteristics among various playing positions. Furthermore, they are consistent with the study by Jouber et al. (2020), which reported no differences in speed and agility, but identified differences in strength that favored defensive players. However, our study contrasts with the findings from Agoun et al. (2023), which highlighted differences in both speed and explosive strength between positions.

The researcher emphasizes the importance of coaches considering the unique characteristics of each playing position when developing training programs. In this context, Abdelmalek, et al. (2019) highlight that every playing position has distinct physical requirements that set it apart from others.

Presentation, analysis, and discussion of Skills tests results categorized by playing position.

Table 6 displays the mean and standard deviation of the technical characteristics of sample individuals categorized by their playing positions.

the technical characteristics	Playing position	A sample Volume	mean	standard deviation
Zigzag running while dribbling the ball.	Defense	14	24.43	1.62
	Midfield	12	24.31	1.45
	Attack	10	24.12	1.56
Kicking the ball for the longest distance.	Defense	14	25.85	1.46
	Midfield	12	25	1.47
	Attack	10	25.40	1.42
Effectiveness of shots on goal	Defense	14	19	1.36
	Midfield	12	19	1.34
	Attack	10	19.98	1.49

Source: SPSS outputs prepared by the researcher

Table 6 presents the means of Zigzag running while dribbling the ball. for the sample individuals categorized by their playing positions (defense, midfield, and attack), which were (24.43, 24.31, 24.12), respectively. The attackers achieved

the best result by a slight margin. In terms of Kicking the ball for the longest distance., the means for the same positions were (25.85, 25.00, 25.40), with defensive players achieving the best result, also by a narrow margin. For Effectiveness of shots on goal, the means for the sample group were (19, 19, and 19.98), favoring the attacking players.

Table 7: One-way ANOVA results of technical characteristics by playing position among sample individuals.

the technical characteristics	Variance source	Sum of squares	ddl	Mean squares	F value	Sing
Zigzag running while dribbling the ball.	Between Groups	0.563	2	0.282	0.117	0.890
	Within Groups	79.715	33	2.416		
	total	80.278	35			
Kicking the ball for the longest distance.	Between Groups	4.775	2	2.387	1.124	0.337
	Within Groups	70.114	33	2.125		
	total	74.889	35			
Effectiveness of shots on goal	Between Groups	0.393	2	0.196	0.101	0.904
	Within Groups	64.357	33	1.950		
	total	64.750	35			

Source: SPSS outputs prepared by the researcher

Table 7 indicates that there are no statistically significant differences in skill characteristics specifically,(Zigzag running while dribbling the ball, Kicking the ball for the longest distance, and Effectiveness of shots on goal) among individuals in different playing positions (defense ,midfield, attack). The F values for these characteristics were (0.117, 1.124, 0.101), respectively, none of which are statistically significant.

The researcher attributes the lack of differences in skill characteristics to the absence of specialized training programs provided by coaches. This study contrasts with the findings of abdelmalek et al. (2019), which identified differences in skill characteristics based on playing positions. Additionally, our results differ from those of Omar Ibrahim (2012) and Nasser (2006).

The researcher acknowledges that differences in skill characteristics among players are expected due to their varying positions on the field. Tactical tasks and responsibilities influence these skill sets. For instance, it is common for attacking players to stand out from others because of their shooting abilities, while midfielders are often recognized for their superior ball control skills.

Finding and propositions results:

Based on the findings of the study and considering the limitations of the sample and procedures, the following conclusions were drawn:

- There are no statistically significant differences in physical characteristics (Transitional speed, Explosive power, and Agility) among individuals in different playing positions.
- There are also no statistically significant differences in skill characteristics,(Zigzag running while dribbling the ball., Kicking the ball for the longest distance., and Effectiveness of shots on goal), among individuals in various playing positions.

Based on the presentation, discussion of the results, and the conclusions drawn, the researcher suggests the following recommendations:

-Conducting the same study with different age groups.

- Performing a comparative study on other physical and skill characteristics with a larger sample size.

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