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Faculty of Physical Education, University of Sadat City
Journal of Theories and Applications of physical education sport sciences

Original Article

Title:

Key Technical and Physical Determinants and Standardized Tests for Selecting and Directing Players to the Different Playing Positions in Basketball

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Doi: 10.21608/jat.2023.306916

Abstract

A strong team foundation, such as basketball, is the process of selecting the appropriate players for all playing positions scientifically and objectively. This study aims to identify the key technical and physical determinants as well as set standardized tests necessary for selecting and directing players to different play positions in basketball. The data was collected by a survey for basketball female players under 16 years old of the top three places in the Cairo league season 2022/2023. The results revealed that the key technical determinants of position 1 were dribbling skills and ball control, passing skills, outside shots, and defensive pressure; position 2 was outside shots, moves without the ball, dribbling skills, and ball control, defensive pressure; position 3 was inside and outside shots, defensive rebound; position 4 was inside and outside shots, offensive and defensive rebound; and position 5 was inside shots, offensive and defensive rebound, and block shots. Furthermore, the key physical determinants for position 1 were agility, acceleration, legs and arms power, speed "short distance", and deceleration; position 2 was acceleration, legs and arms power, speed "relatively long distances", and agility; position 3 was legs and arms power, speed "relatively long distance", and agility; position 4 and 5 were legs power and arms strength. The appropriate tests to assess these determinants: Dribble Skill with its entire Types, Speed and Accuracy Passing, Spot Up Shooting, Shooting from Close to the Basket, Rebound Shooting Task, Moving Without the Ball, Defense Against Dribbler, Defensive Rebound, Block Shots, Illinois Agility, 10-m, 20-m, and 28-m Sprint, 5-0-5 m Sprint, Vertical Jump, Push Up, and Pushing a Medicine Ball. These tests were seven-level scale ranging from excellent to very poor.

Keywords:
Technical and Physical Tests, Basketball directing players, Basketball positions

Introduction

Basketball is a team game, and despite that, it relies on the abilities and capabilities of the individual players to achieve collective victories (Cornberg, 2021). Each player has a specific role, responsibilities, and tasks based on their position (Schleyer, 2019). In basketball, there are five playing positions. Position 1 known as the "Point Guard," is the coach on the court who understands the strengths and weaknesses of both teams and can initiate attacks; position 2 known as the "Shooting Guard", is the player responsible for scoring the highest number of points in the match; position 3 known as the "Small Forward", is the fastest player who excels at cutting and can play both inside and outside the arc; position 4 known as the "Power Forward"

is the defensive anchor who protects the basket with strength and position 5 known as the "Center" is the owner of the most scoring points close to the basket (Cornberg, 2021; Mac, 2021; Rose, 2013).

To build a strong team, coaches play a crucial role in selecting players and assigning them to positions where they can contribute most effectively and add value to the team (Dežman et al., 2001; Schleyer, 2019). A good selection process is essential to players' subsequent performance and attainment of the best levels of the game (Pérez-Toledano et al., 2019; Sushko et al., 2019). The selection is based on a set of criteria and determinants such as morphological features, physical attributes, functional capabilities, psychological factors, and technical characteristics (Sushko et al., 2019).

These specific criteria vary and are greatly affected by growth stages. Morphological determinants, such as height and weight differ in their rates of speed before puberty than after puberty (Abdel-Fattah & El-Rouby, 2018). The highest body growth speed in females occurs between the ages of 9-12, while in males it happens between 11-13. Body length growth ceases around the ages of 17-18 for males and 16-17 for females. Physical determinants like speed, endurance, strength, agility, and other physical components, also have sensitive periods of growth. So the general endurance develops between the ages of 10-12 and 17-18, speed between the ages of 9-12 and 14-16, special endurance between the ages of 13-15 and 17-19, strength distinguished by speed between the ages of 9-10 and 14-17, maximum strength between 14-17 years of age, and agility between 7-10 years of age (Abdel-Fattah & El-Rouby, 2018). Regarding functional determinants, the organs of respiration experience the most growth between the ages of 12-16, and the body's construction and maximum growth functions are achieved between 17-21 for males and 16-20 for females (Abdel-Fattah & El-Rouby, 2018). In terms of technical determinants, individuals can absorb 90% of their motor skills by the age of 12, and movement speed increases from ages 7-16 (Abdel-Fattah & El-Rouby, 2018). Ratib and Khalifa (2005) state that the puberty period, characterized by numerous changes and instability, typically occurs for girls between the age of 10-13 and boys between 12-14, as mentioned in this regard Vuković et al. (2022) that the entry of children into puberty represents a critical problem in selecting and guiding players in basketball due to the lack of stability and clarity of their actual abilities.

Based on the aforementioned, it is clear that the age between 15-17 years is approximate "specifically, basketball stages under 16 years as a minimum to under 18 years as a maximum" The appropriate age to stabilize and clarify the growth and development of these determinants. This is when the selection process takes place and the players guidance to playing positions because more accurate and successful. El Oraby (2004) indicates that the under-16 stage is the beginning of the precise specialization of players and is the real nucleus of the first teams, also as mentioned by Trunić & Mladenović (2014) that at the age of 16, players are selected for playing positions from (1-5) according to criteria, and at the age of 18, the selection process is confirmed. This is contrary to what the researcher observed from the identification of positions for players at an early age without objective means of measurement by the coaches, and this resorted to a survey of players in various clubs in Cairo and Giza Governorate, such as Al Shams Club, Wadi Degla Club, Al-Ahly Club, Zamalek Club, Al-Zohour Club, Al-Gezira Club, Maadi Club, Shooting Club, 6th of October Club, and other, and between the different age stages from under 16 years old to the first-team.

The survey included players from different age groups, with a total of 162 participants (104 females and 58 males). When asked about the age at which their playing positions were determined, the responses were as follows: 56 players voted for under 11 years old (35%), 16

players for under 12 years old (10%), 20 players for under 13 years old (12%), 24 players for under 14 years old (15%), 26 players for under 16 years old (16%), 16 players for under 18 years old (10%), and 4 players for under the first team (2%). Additionally, they also responded to the question, "Have you had the experience of playing in a position for years, and another coach changed your playing position?" 120 players answered yes (74%), while 42 players answered no (26%). In response to the question, "Were you chosen to play in the position based on the technical, physical, and psychological tests that you underwent, or based on the coach's experience and his vision of your skills and abilities on the court?" Their response was 126 votes that they were chosen based on the coach's experience at a rate of (78%), and 36 votes based on the tests at a rate of (22%). These findings indicate that most coaches determined the playing positions for the players at an early age, between under 11 and under 14 years old, as reflected by 116 votes (72%). Furthermore, they were selected to play the position based on the coach's personal experience and vision.

Hence, the researcher tended to determine the essential technical and physical determinants required for the selection and guidance of players to their appropriate positions in basketball, by defining and designing tests with standardized criteria to measure these determinants in order for the selection to be done in an objective and sound way, which helps to achieve good selection and guidance for the players. This is consistent with what was mentioned by Cui et al. (2019) that the results of appropriate tests help in identifying the technical and physical characteristics of basketball players and discovering talents, which is an important predictive process for whether they will reach a higher level of this sport as well as show decent performance in matches. Furthermore, Ivanović et al. (2022) state that the more specific and objective the test the more effective it is in ensuring accurate player selection, guidance, and training.

This study aims to identify the key technical and physical determinants as well as set standardized tests necessary for selecting and directing players to different play positions in basketball.

Questions:

1. What are the key technical determinants of selecting and directing players to the different playing positions in basketball?
2. What are the key psychical determinants of selecting and directing players to the different playing positions in basketball?
3. What are the tests and their standard levels for the key technical and physical determinants for selecting players and directing them to the different playing positions in basketball?

Material and Methods

Approach:

The descriptive design was followed, by using the survey method.

Participants:

The intentional approach was utilized to select the basic sample from female players registered in the Egyptian Basketball Federation under 16 years old, who achieved the top three places in the Cairo region league during the 2022/2023 season. The sample consisted of 57

female players, including (18) players from Gezira sporting club (team A), (18) players from Al Ahly sporting club (team A), and (21) players from Al-Zohour Sporting Club (team A) (mean: ± SD: age: 14.86 ± 0.52 year; training age: 8.32 ± 1.65 years; weight: 62.70 ± 10.08 kg; height: 169.65 ± 7.44 cm).

Note: It was confirmed that the distribution of the sample was moderate under the normal curve in the variables of height, weight, age, and training age. The skewness values ranged between (+ 0.71, -0.36); also the technical variables including dribble skill with its inter types and ball control, passing, outside shots, inside shots, offensive rebound, defensive rebound, moving without the ball, defensive pressure, and block shots, so the skewness values ranged between (+ 0.96, - 0.38); the physical variables, such as agility, acceleration, speed " short distance", speed "relatively long distances", deceleration, legs power, arms strength, right-hand power, left-hand power, so the skewness values ranged between (+ 0.60, - 1.14). The skewness values remained within the range of (±3), indicating the moderate distribution of sample members in all the research variables.

The samples of the second and third exploratory studies were selected randomly way from the research community of female basketball players under 16 years old participating in the Cairo region league for the season 2022/2023 but outside the basic research sample. The sample of the second exploratory study included 12 female players from Wadi Degla Club Maadi Team (B), while the sample of the third exploratory study included 48 female players from four clubs (Wadi Degla Maadi Team (A) (12 players) - Wadi Degla Sheraton (12 players), Al-Zohour sporting Club Team (B) (12 players), Al-Ahly sporting Club Team (B) (12 players).

The sample of the first exploratory study was chosen randomly, 162 basketball players including 104 female players and 58 male players from under 16 years old to the first-team were chosen from 19 different sports clubs in the governorates of Cairo and Giza during season 2022/ 2023, Table 1.

Table 1. the describtion of the first exploratory sample (n= 162**)**

Age Stages	N	Percentage	Training Age (years)	
			M	SD
Under 16	24	15%	8.08	1.64
Under 18	34	21%	8.94	2.68
Under 20	26	16%	7.54	2.52
Frist-team	78	48%	11.59	3.58

Procedures:

1. The Online Questionnair

Applying an online questionnaire "first exploratory study" from July 15th to August 1st, 2022 on 162 basketball players, from 19 sporting clubs in the governorates of Cairo and Giza to represent the research problem, their responses to the questions are shown in figure1, 2, 3and4.

2. Previous studies and online articles related to the present study from 2000 until now were collected from August 5th, 2022 to October 30th, 2022.

3. Four of these previous studies (e.g. Bianchi et al., 2017; Drinkwater et al., 2008; Dežman et al., 2001; Trninić and Dizdar, 2000) and seven online articles (e.g. Get Hyped Sports, 2022; Lab, 2021; Mac, 2021; Cornberg, 2021; Judy, 2020; *Defining the Positions*, 2015; *Basketball Positions*, 2012) dealt with technical variables, and ten of these previous studies (e.g Ivanović et al., 2022; García et al., 2020; Cui et al., 2019; Vázquez-Guerrero et al., 2018; Pion et al., 2018; Kucsa and Mačura, 2015; Abbas and Abbas, 2012; Abdelkrim et al., 2010; Delextrat and Cohen, 2009; Ziv and Lidor, 2009) dealt with physical variables for basketball players' positions, was analyzed.

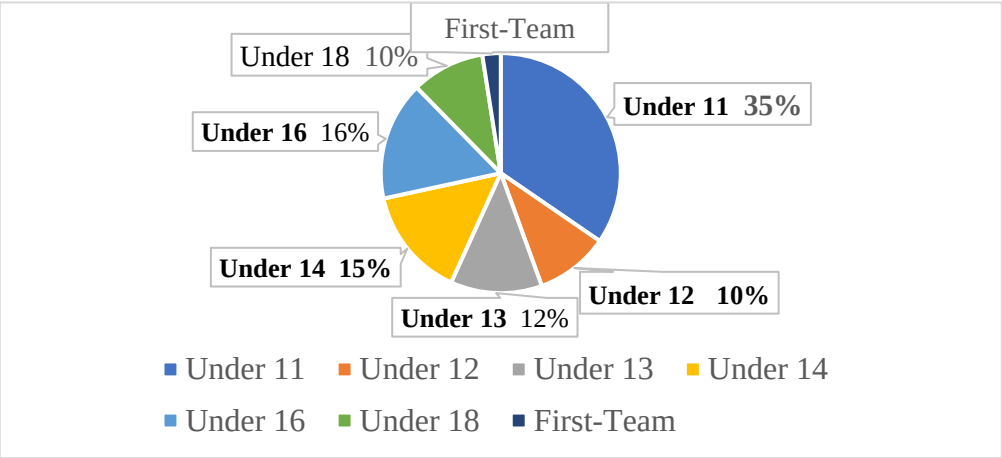

Figure 1. Response to the question "When was your playing position determined (at what age)?"

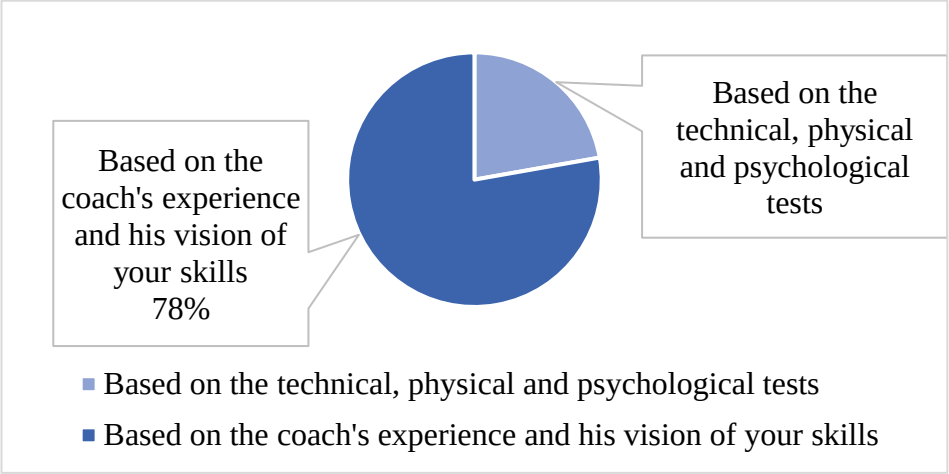

Figure 2. Response to a question "Were you chosen to play in the position based on the technical, physical and psychological tests that you underwent, or based on the coach's experience and his vision of your skills and abilities on the court?"

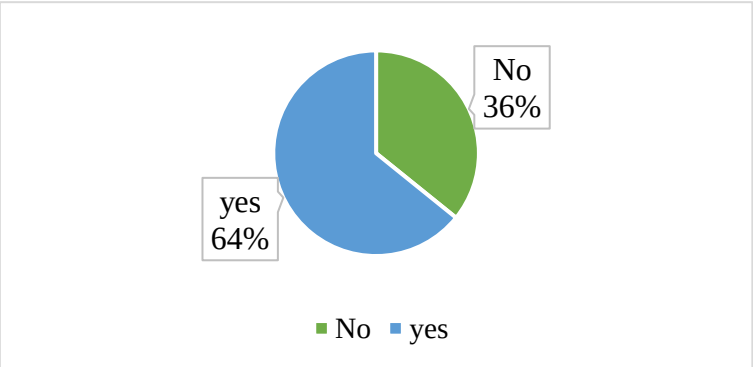

Figure 3. Response to the question "Have you had the experience of playing in a position for years, and another coach changed your playing position?"

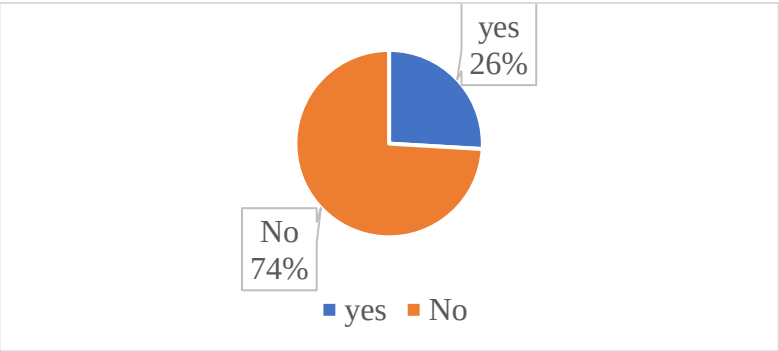

Figure 4. Response to the question "Would you accept changing your playing position to another position you have not played before?"

4. Select the technical variables

The variables that got 50% and above in analyzing and the physical variables that got 30% and above in analyzing previous studies of basketball players' positions. Because some of these studies didn't mention physical variables for some positions, and others mentioned just one or two variables as a maximum, Tables 2 and 3.

5. Then presented the technical and the physical variables that were having a high repetitions rate in the previous step to basketball experts through the personal interview from November 15th to November 30th, 2022. Tables 4 and 5 show the repetitions and percentages of experts' opinions about the key technical and physical determinants of players' positions in basketball.

Note: The expert should meet all the following criteria: "have a classification (A), worked in the field of basketball as a coach "training for first teams or the national team" or as a lecturer with at least 15 years of experience, and they were former players". A total of 17 experts fulfilled these criteria and participated in the study.

Table 2. Repetitions and Percentages of Technical Variables at Offence and Defense for Players' Positions at Basketball that Got 50% and Above in Analyzing References (n=11)

Position	Type of Technical Variable	Technical Variables	Number of Repetitions	%
Position 1	Offense	Ball control- highly dribbling skill	10	91%
		passing skills	8	73%
		Outside shots	7	64%
	Defense	Defensive pressure	9	82%
Position 2	Offense	Outside shots	10	91%
		Ball control- dribbling skills	6	55%
		Moving without the ball	7	64%
	Defense	Defensive pressure	6	55%
Position 3	Offense	Inside and outside shots	10	91%
	Defense	Rebound	7	64%
Position 4	Offense	Inside shots	10	91%
		Rebound	7	64%
	Defense	Rebound	10	91%
Position 5	Offense	Rebound	9	82%
		Inside shots	8	73%
	Defense	Rebound	10	91%
		Block shots	9	82%

Table 3. Repetitions and Percentages of Physical Variables for Players' Positions in Basketball that Got 30% and Above in Analyzing References (n=10)

Position	Physical Variables	Number of Repetitions	%
Position 1	Agility	6	60%
	Acceleration	5	50%
	Legs power	7	70%
	Speed/ short sprint	6	60%
	Decelerations	3	30%
Position 2	Acceleration	3	30%
	Legs power	5	50%
	Speed/ relatively long sprint	4	40%
	Agility	3	30%
Position 3	Legs power	3	30%
	Speed/ relatively long sprint	3	30%
	Agility	3	30%
Position 4	Legs power	4	40%
	Arms strength	3	30%
Position 5	Legs power	4	40%
	Arms strength	3	30%

Table 4. Opinions of Experts on the Technical Determinants of Offense and Defense for Players' Positions in Basketball that Got 50% and Above in Analyzing References (n= 17)

Position	Type of Technical Variable	Technical Variables	Number of Opinions	%
Position 1	Offense	Ball control- highly dribbling skill	17	100%
		passing skills	17	100%
		Outside shots	17	100%
		Offensive transition*	6	35%
		Dribble penetration*	5	29%
	Defense	Defensive pressure	15	88%
		Defensive transition*	6	35%
Position 2	Offense	Outside shots	17	100%
		Ball control- dribbling skills	16	94%
		Moving without the ball	16	94%
		Offensive transition*	6	35%
		Dribble penetration*	5	29%
	Defense	Defensive pressure	14	82%
		Defensive transition*	6	35%
Position 3	Offense	Inside and outside shots	17	100%
		Moving without the ball*	2	12%
		Offensive transition*	6	35%
		Offensive rebound*	10	59%
		Dribble penetration*	5	29%
	Defense	Defensive Rebound	17	100%
		Defensive pressure*	1	6%
		Defensive transition*	6	35%
Position 4	Offense	Inside shots	17	100%
		Outside shots*	17	100%
		Rebound	17	100%
		Rebound	17	100%
	Defense	Defense help*	2	12%
		Block shots*	2	12%
Position 5	Offense	Rebound	17	100%
		Inside shots	17	100%
		Rebound	17	100%
	Defense	Block shots	17	100%
		Defense help*	2	12%

(*) *determinants added by experts*

Table 5. Opinions of Experts on the Physical Determinants for Players' Positions in Basketball that Got 30% and Above in Analyzing References (n=17)

Position	Physical Variables	Number of Opinions	%
Position 1	Agility	17	100%
	Acceleration	17	100%
	Legs power	17	100%
	Arms power*	17	100%
	Speed/ short sprint	17	100%
	Decelerations	15	88%
Position 2	Acceleration	17	100%
	Legs power	17	100%
	Arms power*	17	100%
	Speed/ relatively long sprint	16	94%
	Agility	17	100%
	Deceleration*	2	12%
Position 3	Legs power	17	100%
	Arms power*	17	100%
	Speed/ relatively long sprint	16	94%
	Agility	17	100%
Position 4	Legs power	17	100%
	Arms power*	10	59%
	Arms strength	16	94%
Position 5	Legs power	17	100%
	Arms power*	1	6%
	Arms strength	16	94%

(*) *determinants added by experts*

According to the experts' opinions, the technical and physical determinants were chosen for basketball players' positions, which were repeated by 80% and above.

6. Collecting Tests

Then tests were collected from scientific references (e.g. Abdel-Fattah& El-Rouby, 2018; Allawi & Radwan, 2001; Al-Tikriti & Al-Hajjar, 2012; Barth & Boesing, 2010; Bompa & Carrera, 2015; Clark, Lucett & Kirkendall, 2010; Gambetta, 2007; Matulaitis et al., 2020; Moselhy, 2020; Parfitt & Hardy, 1993; Sodaitis, 2020; Thakur & Mahesh, 2016) to measure some of these determinants such as Speed and Accuracy Passing Test; Spot Up Shooting Test; Shooting from Close to the Basket Test; Rebound Shooting Task Test; Illinois Agility Test; 10-meter Sprint Test; 5-0-5 meter Sprint Test; 20-meter Sprint Test; 30-meter Sprint Test; Vertical Jump Test; Pushing a Medicine Ball Test; Push Up Test. Additionally, some tests were designed such as the Moving Without the Ball Test; Defensive Pressure Test; Defensive Rebound Test; Block Shot Test, and modified the Test of Dribble Skill with its entire Types to be better suited and accommodate a large number of participants.

All the tests were presented to the 17 experts through the personal interview, Table 6 shows the repetitions and percentages of experts' opinions about the appropriate tests to measure the key technical and physical determinants of players' positions in basketball.

Table 6. Repetitions and Percentages of Experts' Opinions about Appropriate Tests to Measure the Key Technical and Physical Determinants of Players' Positions in Basketball (n = 17)

Variables		Determinants	Tests	Number of Opinions	%
Technical	Offense	Ball control and all types of dribbling skill	Dribble skill with its entire types Test	17	100%
		Passing skill	Speed and accuracy passing Test	17	100%
		Outside shots	Spot up shooting Test	17	100%
		Inside shots	Shooting from close to the basket Test	17	100%
		Offense rebound	Rebound shooting task Test	16	94%
		Offensive moves without a ball	Moving without the ball Test	8	47%
	Defense	Defense pressure	Defensive pressure Test	7	41%
		Defense rebound	Defensive Rebound Test	8	47%
		Block shots	Block shots Test	7	41%
Physical		Agility	Illinois Agility Test	17	100%
		Acceleration	10-meter Sprint Test	17	100%
		Deceleration	5-0-5 meter Sprint Test	15	88%
		Short distant sprint	20-meter Sprint Test:	17	100%
		relatively Long distant sprint	30-meter Sprint Test	16	88%
		Legs power	Vertical jump Test	17	100%
		Arms power	Push 3kg Medicine Ball Test	17	100%
		Arms strength	Push up Test	15	88%

7. According to experts' opinions, modifications were made to the measurement method of certain tests. For example, Dribble Skill with its entire Types Test by converting the time into a degree, then combines it with the performance criteria to provide a single score that accurately reflects the player's level in the test. A modification has also been added in the way the Speed and Accuracy Passing Test to involve players moving back and forth until the allocated test time ends, and the total points obtained are calculated. Defense Against Dribbler Test was also used to measure the defensive pressure because it is more objective in measurement and gives individual indicators to the players without being affected by another variable (El Oraby, 2004). Furthermore, The running distance has also been modified, "relatively long distance" for basketball players, from a 30-meter sprint to a 28-meter sprint, as experts indicated that it would be more suitable for basketball players, especially since the length of the court is 28-meter.

8. Other tests were also designed for tests that have a repetition rate of experts' opinions less than 80%, it was presented again to the experts, and they unanimously agreed to the modified tests Table 7.

Table 7. Appropriate Tests Approved by Experts to Measure the Main Technical and Physical Determinants of Players' Positions in Basketball (n=17)

variables		Determinants	Tests
Technical	Offense	Ball control and all types of dribbling skill	Dribble skill with its entire types Test
		Passing skill	Speed and accuracy passing Test
		Outside shots	Spot up shooting Test
		Inside shots	Shooting from close to the basket Test
		Offense rebound	Rebound shooting task Test
		Offensive footwork moves without a ball	Moving without the ball Test
	Defense	Defense pressure	Defense Against Dribbler Test
		Defense rebound	Defensive Rebound Test
		Block shots	Block shots Test
Physical		Agility	Illinois Agility Test
		Acceleration	10-meter Sprint Test
		Deceleration	5-0-5 meter Sprint Test
		Short distant sprint	20-meter Sprint Test:
		Relatively long distant sprint	28-meter Sprint Test
		Legs power	Vertical jump Test
		Arms power	Push 3kg Medicine Ball Test
		Arms strength	Push up Test

Technical and physical determination Tests

The authore is explanating the Tests of key technical and physical determinants of playing positions, as a following:

- **Dribble Skill with its entire Types Test**

The purpose of this test is to measure ball control and all types of dribbling skills. The player stands behind the starting line holding a basketball. When a whistle is heard, the player begins dribbling with their left hand following the arrows as shown in Figure 5. At each numbered arrow, the player performs the corresponding dribbling skill, such as back pivot with the left hand; back pivot with right hand; behind back with the left hand; behind back with right hand; between legs crossover with the left hand; between legs crossover with right hand; crossover between small cones; left-hand dribble penetration; pull back dribble with the left hand; pull back crossover to change hands; right-hand dribble penetration; right-hand Hesitation; pull back dribble with right hand; pull back crossover to change hands; left-hand Hesitation; inside-outside dribble with the left hand; inside-outside dribble with right hand; dribble to the finish line (Moselhy, 2020).

The total score for the test is 100 degrees, divided into 10 for time and 90 for skill performance accuracy. Each type of dribbling skill has five degrees divided into the following

criteria: (1) low-level dribble, (2) power in dribble, (3) ball protection by the body, (4) forward-looking, and (5) ball control.

Notice 1*:* If the player commits a violation in any type of dribble skills test, the degrees for that particular type will be deducted.

Note 2: The time for each player is recorded to the nearest 1/10 of a second, and then converted into degrees based on Table 8.

Table 8: Convert time to score in a Dribble Skill with its entire Types Test

Time	degree	Time	degree
30 sec. or less	10	38.01 : 40 sec.	5
30.01 : 32 sec.	9	40.01 : 42 sec.	4
32.01 : 34 sec.	8	42.01 : 44 sec.	3
34.01 : 36 sec.	7	44.01 : 46 sec.	2
36.01 : 38 sec.	6	46.01 or more	1

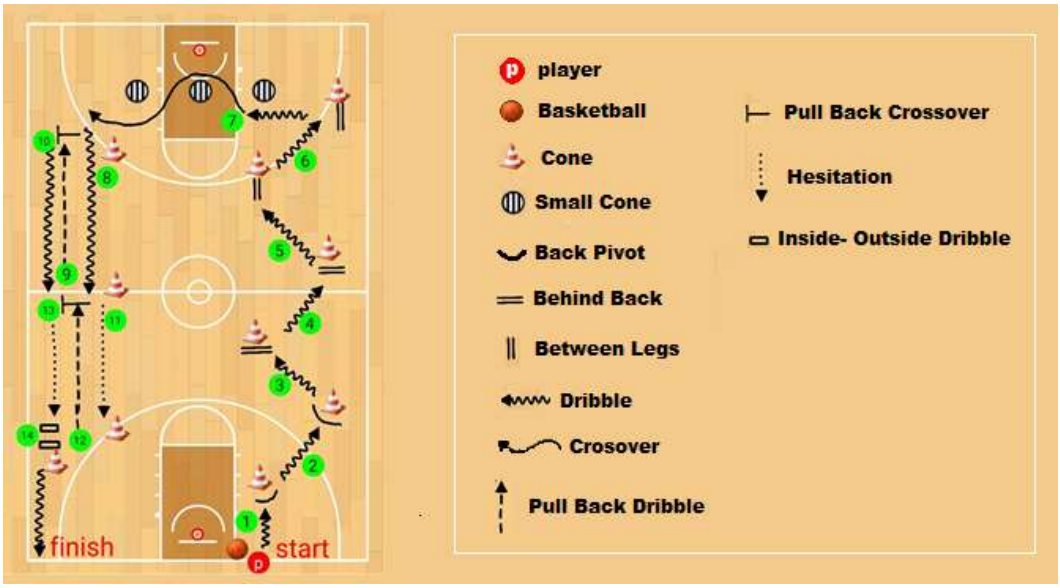

Figure 5. Dribble skill with its entire Types Test

- **Speed and Accuracy Passing Test**

The purpose of this test is to measure the speed and accuracy of passing skills. The player stands behind the starting line holding a basketball, facing the wall target (A). Upon hearing the whistle, the player starts the test by performing a chest pass to the first target square (A), and receiving the ball while moving to the second target square (B), performing the same at target square (B), then target square (C) and so on to the last target (F), and goes forth until the time for performing the test ends as shown in Figure 6. If the player hit the square or on the line, will get one point for each. The test score was the total points scored over the duration of the thirty-second test.

Notice: no points are awarded if the player's foot is on or over starting line, or or if any pass other than a chest pass is performed (Hopkins, Shick & Plack, 1984; Sachanidi et al., 2013; Sodaitis, 2020).

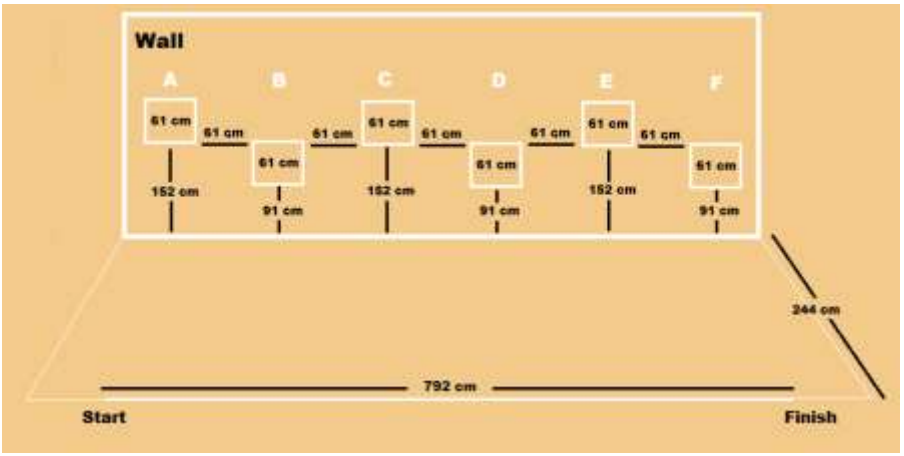

Figure 6. Speed and Accuracy Passing Test

- **Spot Up Shooting Test**

The purpose of this test is to measure outside shots. The player has 25 attempts divided into 5 attempts of jump shots from five different spots on the court: 1) Top of the key, 2) Left-wing area, 3) Right-wing area, 4) Left corner area, and 5) Right corner area, as shown in Figure 7. The test score is the number of successful shots scored out of 25 (Thakur & Mahesh, 2016).

Figure 7. Spot Up Shooting Test

- **Shooting from Close to the Basket Test**

The purpose of this test is to measure inside shots from five different spots on the court, represented by the letter "w": Spots 1 and 5 are located close to the basket shot at a distance of 2.74 m from the perpendicular of the basket construction, whereas spots 2, 3, and 4 were mid-range shots at a distance of 2.74 m from the perpendicular of the middle of the basketball rim, as Figure 8.

When the whistle is heard, the player starts shooting to the basket from spot 1 then spot 2, and so on to spot 5, and repeats this sequence continuously till the end of 60 seconds using dribble skill in the transition between spots. The player gets two points for a successful shot and one for an unsuccessful shot if the ball falls at the rim from above. The test score is determined by the total number of points accumulated within the 60-second timeframe (Matulaitis et al., 2020).

Figure 8. Spot Up Shooting From Close to the Basket Test

- **Rebound Shooting Task Test**

The purpose of this test is to measure Offensive rebound. The player stand within the two-point key holding basketball when heard the whistle. The player performs shooting attempts. After each shot, the player must retrieve their ball. The test score is determined by the total number of successful baskets scored within the 30-second duration (Parfitt & Hardy, 1993).

- **Moving Without the Ball Test**

The purpose of this test is to measure offensive footwork moves without a ball, including all movement types "Quick Start, Change of Pace, Change of Direction, Fake, Jump Stop, Stride Stop, Jump and Land, Pivot and Turn Forward, and Backward" (Arumugam et al., 2020; Fawzy, 2014; Moawad, 2003; Moselhy, 2022).

The player stands behind the starting line. Upon hearing the start signal, the player begins the test by running following the arrows as shown in Figure 9. At each numbered arrow, the player performs the corresponding offensive footwork skill, such as body fake; Quick Start; change of speed (deceleration); change of speed (acceleration); change of direction; jump stop followed by pivot movements (back and front); Jump-up and Landing; Stride Stop; running to the finish line.

The time is recorded for each player, rounded to the nearest 1/10 second. If a player skips a cone without performing the required move, two seconds are added to their recorded time.

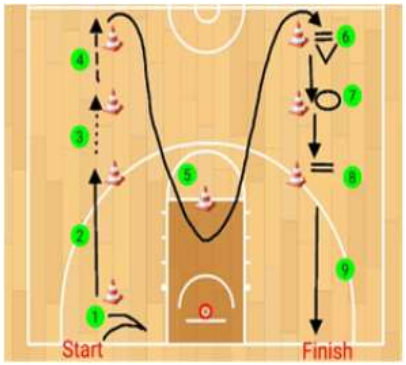

Figure 9. Moving Without the Ball Test

- **Defense Against Dribbler Test**

The purpose of this test is to measure defense pressure and the speed of defensive movements. The defensive player stands behind the start line with his back facing the court. Upon hearing the start signal, the player begins by making defensive side steps to reach each chair, touching each one before moving on to the next. This sequence continues from chair 1 to chair 6 until the player reaches the last chair, then turns and runs quickly to the finish line, as Figure 10. The player's time is calculated to the nearest 1/10 second (El Oraby, 2004).

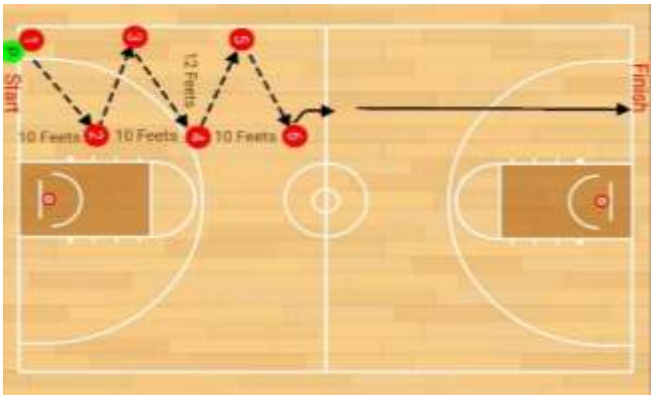

Figure 10. Defense against dribbler Test

- **Defensive Rebound Test**

The purpose of this test is to measure defensive rebounds. The coach carries the basketball and stands at the free-throw line, and the tested player stands at the highest point of the semi-circle in the paint area. The coach attempts to direct the ball into the specified rectangles on the right board “rectangular (1)” and to the left board “rectangular (2)” Figure 11. The coach directs the ball five times in each rectangular, but not in order, and the player must run and jump to secure possession of the ball, demonstrating their defensive rebounding skills.

The test score is determined by the total number of successful defensive rebounds the player achieves, where reaching the highest point in the air with his hands fully extended.

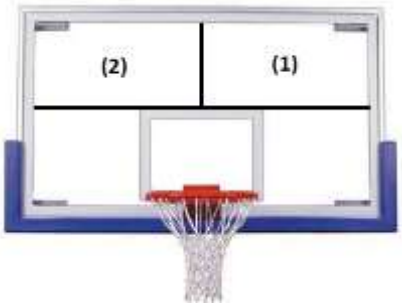

Figure 11. Identified rectangles for the defensive rebound test

- **Block Shots Test**

The purpose of this test is to measure block shots. The player stands directly below the basket hoop. Upon hearing the start signal, the player runs towards cone No. (1), then jumps

directly in front of it to the highest point with the right arm raised to the top and the feet straight. The left foot is positioned slightly forward, and the other arm is extended to the side, then lands vertically. Next, the player runs in the direction of cone No. (5), jumps in front of it to the highest point with the left arm raised to the top and the feet straight. The right foot is positioned slightly forward, and the other arm is extended to the side, then lands vertically.

The player continues by running towards cone No. (2) and performing the same actions as at cone No. (1). Then runs towards cone No. (4) and repeat the actions performed at cone No. (5). lastly, the player runs toward cone No. (3), jumps in front of it to the highest point with both arms raised to the top and feet straight, and lands vertically. Then turns and returns to the starting point, spot-up as in Figure 12. This sequence is repeated until the end of the 15-second time limit.

The player is awarded 5 degrees for each correctly executed block, based on the following five criteria: (1) Jumping directly in front of the cone, (2) Jumping to the highest point, (3) Raising the appropriate hand to the top straight, (4) Keeping the feet straight, with the appropriate foot slightly forward, (5) Landing vertically.

If the player fails to meet any of these criteria, their grade will be reduced based on the number of parameters that were not met. The test score is the total degrees obtained within a 15-second timeframe.

Notice: If contact is made with the cone while blocking shots or when landing, the degree of this cone is canceled and the player gets a zero for it.

Figure 12. Spot Up Block Shots Test

- **Illinois Agility Test**

The purpose of this test is to measure agility. The player stands behind the start line and once the whistle is heard. The player runs at a maximum speed following the black arrow, from the start to end lines, as shown in Figure 13. Time is recorded to the nearest 1/10 second (Gambetta, 2007).

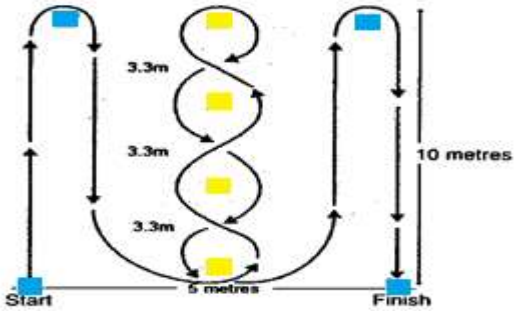

Figure 13. Illinois Agility Test

- **10-meter Sprint Test**

The purpose of this test is to measure acceleration. The player stands behind the start line, and once the whistle is heard. The player runs 10 meters at a maximum speed until reaches the end line. Time is recorded to the nearest 1/10 second (Gambetta, 2007).

- **5-0-5 meter Sprint Test**

The purpose of this test is to measure deceleration. The player stands behind the start line and once the whistle is heard. The player runs at a maximum speed until reaches the turning line (third cone), then circles it and returns at a maximum speed to the finish line, as in Figure 14. The time is recorded from starting the second cone passing to the third cone and then returning to the second cone to the nearest 1/10 second (Clark et al., 2010).

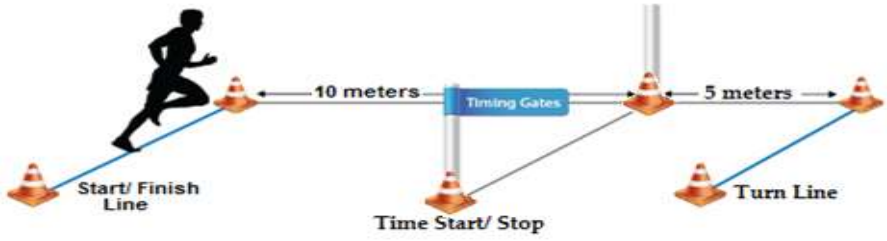

Figure 14. 5-0-5 meter Sprint Test

- **20-meter Sprint Test**

The purpose of this test is to measure a short-distant sprint for 20 meters. The player stands behind the start line, once the whistle is heard. The player runs 20 meters at a maximum speed until reaches the end line. Time is recorded to the nearest 1/10 second (Barth & Boesing, 2010).

- **28-meter Sprint Test**

The purpose of this test is to measure a relatively long-distant sprint for 28 meters. The player stands behind the start line, once the whistle is heard. The player runs 28 meters at a maximum speed until reaches the end line. Time is recorded to the nearest 1/10 second.

- **Vertical Jump Test**

The purpose of this test is to measure Legs power. The player stands close to the wall sideways, holding a tape with the hand close up to the wall. The player extends the arm overhead and makes a mark as a starting position, then bend the knees and performs a quick jump as far as possible, extending the arm at the highest point and making a mark at that point, as in Figure 15. The distance between the two marks is measured to the nearest centimeter (Bompa & Carrera, 2015).

Figure 15. Vertical Jump Test

- **Push 3kg Medicine Ball Test**

The purpose of this test is to measure arm power. The player stands behind the throwing line. Facing the throwing area, the player holds the ball in one of the hands, then pushes the ball without crossing the throwing line. Once with the right hand and the other once with the left hand. The attempt is scored based on the closest distance to the starting line, with a measurement accuracy of 1 centimeter (Allawi & Radwan, 2001).

- **Push-Up Test**

The purpose of this test is to measure arms strength. The player starts from a push-up position, with legs extended, back straight, and arms straight. The player bends the elbow until the arms are at a 90-degree angle, returns to the starting position, and performs as many repetitions as possible without pausing at the top of the movement, as in Figure 16. The test score is determined by the number of push-ups completed (Bompa & Carrera, 2015).

Figure 16. Push Up Test

9. The second exploratory study

It was conducted on January 27th, 2023 on (12) female players under 16 years old from Wadi Degla Maadi Club, Team B, from the research community and outside the basic research sample. To ensure the following: the validity of the tests and their suitability for the research sample, the validity of the tools and devices used, the ability of the testers to perform, the training of assistants on the method of measurement and registration, and the validity of registration cards. The results of this study revealed the validity of the tests and their suitability for the sample, the validity of the tools and devices used, and the assistants' understanding of the measurement method, taking into account the fixation of the assistants to measure the same tests for the sample as a whole, as well as the validity of the registration cards. Regarding the ability of the testers to perform, it was found that it is better to divide the tests into two days,

one day for the technical tests, then the next day for the physical tests, so that they can perform without the intervention of the fatigue factor, which affects the result.

10. The third exploratory study

It was carried out from January 29, 2023 to February 5, 2023 and from February 6th, 2023 to February 13th, 2023, with female players under-16 of age (n=48), so that the measurements for each club were executed on two consecutive days from the following clubs, in this order: (Wadi Degla Maadi Team (A) (12 players) - Wadi Degla Sheraton (12 players) - Al-Zohour Club Team (B) (12 players) - Al-Ahly Club team (B) (12 players), from the research community and outside the basic research sample. aiming to ascertain the scientific parameters of the tests (validity, reliability and objectivity).

Note: It was confirmed that the distribution of the third exploratory sample was moderate under the normal curve in the technical variables: dribble skill with its inter types and ball control, passing, outside shots, inside shots, offensive rebound, defensive rebound, moving without the ball, defensive pressure, and block shots, so the skewness values ranged between (+ 0.88, - 0.87); also the physical variables: agility, acceleration, speed " short distance", speed "relatively long distances", deceleration, legs power, arms strength, right-hand power, left-hand power, so the skewness values ranged between (+ 1.18, - 1.97). The skewness values are limited between (±3) referring to the moderate distribution of sample members.

11. The validity of all technical and physical tests

The Validity was confirmed by using the validity of the content through scanning scientific references, and the validity of the experts who agreed on all the tests in their final form. Also, The validity of differentiation was calculated for the tests used from January 29th, 2023 to February 5th, 2023, by arranging the scores of the third exploratory sample in descending order (n=48) and taking the highest scores to represent the distinguished group, and it is calculated by (27 %) of their original group as well as for the low score group "the undistinguished group" for comparison between them. The tests have been shown the ability to distinguish between the distinguished and undistinguished groups, as the p-value is less and equal to a significant level (0.05), which indicates that there are statistically significant differences in the main technical and physical tests for selecting and directing players to play positions in favor of the distinguished group Table 9.

12. The reliability of all technical and physical tests

The Reliabiltiy has been ascertained by applying Test-Retest from January 29, 2023, to February 5, 2023, and retests from February 6th, 2023, to February 13th, 2023. There was a week interval between the first and second test application on the exploratory sample (n=48) from the research community, as well as outside the basic research sample taking into account the measurement on the clubs in the same order as the first measurement with the availability of the same conditions and instructions in the two applications. The correlation coefficient was calculated between the first and second application of the technical and physical tests. The tests exhibited a high stability coefficient, ranging from 0.62 to 0.98 in Table 10, indicating proximity to the correct values.

Table 9. Means, Standard Deviations and "t-Test" for Distinguished and Undistinguished Groups in the Technical and Physical Tests (Tests Validity) (n= 26)

Variables		Tests (Units)	Distinguished group (n=13)		Undistinguished group (n=13)		Mean differences	t	P
			M	SD	M	SD			
Technical	Offense	Dribble skill with its entire types Test (deg)	74.85	3.31	52.31	8.08	22.54	9.31	0.00*
		Speed and accuracy passing Test (Pt)	21.62	2.33	15.00	0.00	6.62	10.24	0.00*
		Spot up shooting Test (n)	9.69	0.48	2.38	0.96	7.31	24.53	0.03*
		Shooting from close to the basket Test (Pt)	31.54	4.89	16.15	1.28	15.38	10.97	0.00*
		Rebound shooting task Test (n)	16.69	1.89	9.23	0.93	7.46	12.79	0.00*
		Moving without the ball Test (s)	15.72	0.56	19.30	0.84	-3.58	-12.79	0.02*
	Defense	Defense Against Dribbler Test (s)	11.82	0.44	15.06	0.28	-3.24	-22.56	0.01*
		Defensive Rebound Test (n)	9.92	0.28	3.85	0.69	6.08	29.51	0.01*
		Block shots Test (deg)	24.46	0.78	10.15	0.38	14.31	59.82	0.00*
Physical		Illinois Agility Test (s)	16.08	0.18	20.24	0.43	-4.15	-31.78	0.01*
		10-meter Sprint Test (s)	1.93	0.09	3.10	0.33	-1.17	-12.32	0.01*
		5-0-5 meter Sprint Test (s)	2.64	0.38	3.27	0.09	-0.62	-5.71	0.00*
		20-meter Sprint Test (s)	3.32	0.12	4.17	0.30	-0.85	-9.53	0.01*
		28-meter Sprint Test (s)	4.66	0.08	5.62	0.41	-0.96	-8.42	0.00*
		Vertical jump Test (cm)	41.31	6.05	24.62	1.39	16.69	9.70	0.00*
		Push 3kg Medicine Ball Test with right-hand (m)	8.85	0.28	5.96	0.64	2.89	14.87	0.00*
		Push 3kg Medicine Ball Test with left-hand (m)	7.57	0.26	4.76	0.68	2.81	13.83	0.05*
		Push up Test (reps)	44.46	2.88	14.69	6.03	29.77	16.06	0.01*

** Significant difference between distinguished and undistinguished groups p≤0.05*

Table 10. Means, Standard Deviations and Correlation Coefficient Between First and Second Test Applications in the Technical and Physical Tests (Tests Reliability) (n=48)

Variables		Tests (Units)	First test application		Second test application		r	P
			M	SD	M	SD		
Technical	Offense	Dribble skill with its entire types Test (deg)	64.29	9.64	65.17	13.39	0.62	0.00*
		Speed and accuracy passing Test (Pt)	17.96	2.88	18.31	2.98	0.93	0.00*
		Spot up shooting Test (n)	5.81	2.94	5.48	2.43	0.76	0.00*
		Shooting from close to the basket Test (Pt)	22.96	6.45	21.96	5.17	0.73	0.00*
		Rebound shooting task Test (n)	12.48	3.12	12.42	2.87	0.83	0.00*
		Moving without the ball Test (s)	17.38	1.47	17.61	1.19	0.89	0.00*
	Defense	Defense Against Dribbler Test (s)	13.46	1.28	13.66	1.17	0.93	0.00*
		Defensive Rebound Test (n)	7.10	2.41	6.98	1.90	0.70	0.00*
		Block shots Test (deg)	17.27	5.84	17.54	5.38	0.93	0.00*
Physical		Illinois Agility Test (s)	18.10	1.64	18.09	1.28	0.91	0.00*
		10-meter Sprint Test (s)	2.40	0.50	2.44	0.51	0.97	0.00*
		5-0-5 meter Sprint Test (s)	2.98	0.31	3.00	0.29	0.95	0.00*
		20-meter Sprint Test (s)	3.71	0.37	3.73	0.35	0.98	0.00*
		28-meter Sprint Test (s)	5.11	0.43	5.13	0.41	0.98	0.00*
		Vertical jump Test (cm)	32.46	7.30	32.44	6.72	0.98	0.00*
		Push 3kg Medicine Ball Test with right-hand (m)	7.46	1.19	7.55	1.18	0.98	0.00*
		Push 3kg Medicine Ball Test with left-hand (m)	6.41	1.18	6.40	1.22	0.90	0.00*
		Push up Test (reps)	27.71	11.99	28.75	11.29	0.98	0.00*

** Significant correlation coefficient between first and second test applications p≤0.05*

13. The objectivity coefficient of the tests

It was used to measure the main technical and physical determinants was also investigated. Certified electronic watches and approved measuring tapes were utilized in many tests to ensure accuracy. Additionally, assistants were trained to conduct tests on all sports teams that were measured. The average scores of three arbitrators were also taken in the tests that need to be given a score based on evaluation criteria (Dribble skill with its entire types Test – defensive rebound test - Block shots Test).

14. The technical and physical tests (n=17) were applied in the period from February 15th, 2023 to February 20th, 2023 on the main sample (n=57) of female players under 16 years old who won the first three places in the Cairo Region League for the season 2022/2023, They are the players of Gezira sporting club (Team A), Al Ahly sporting club (Team A) and Al-Zohour Sporting Club (Team A), so that the application was made on each club in two consecutive days, the day for technical tests and the next day for physical tests.
15. All tests were performed on the outdoor courts of the clubs. Furthermore, the tests always began at 5 pm, with temperatures ranging from 17˚ to 21˚C. A warm-up was also taken into account before the start of the tests.

Statistical Analysis:

IBM SPSS version (24) was used to perform the following statistical processing: Independent Samples T-Test to calculate the validity of differentiation by calculating the differences between distinguished and non-distinguished groups; Pearson Correlation test to calculate the reliability of the tests between the first application and the second application of the exploratory research sample; Calculating the percentile ranks.

Results

1. Standard Levels of Technical Tests:

The highest raw scores in the Dribble Skill test with its entire Types, which measures ball control and dribbling skills, were 82 degrees, corresponding to the percentile rank of 100, indicating the highest level of performance. Conversely, the lowest raw scores were 41 degrees, corresponding to the percentile rank of 4.17, representing the lowest performance (Table 11).

Table 11. The Standard Percentile Rank Corresponding to the Raw Score in the Dribble Skill Test with its entire types

Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank
82	100	75	75	64	50	56	25
81	95.83	74	70.83	63	45.83	55	20.83
80	91.67	69	66.67	61	41.67	54	16.67
79	87.50	68	62.50	60	37.50	52	12.50
78	83.33	67	58.33	59	33.33	43	8.33
77	79.17	66	54.17	57	29.17	41	4.17

The highest raw scores in the Speed and accuracy passing Test, which measures passing skill, were 24 points, corresponding to the percentile rank of 100, which represents the highest performance. Furthermore, the lowest raw scores were 15 points, corresponding to the percentile rank of 11.11, representing the lowest performance (Table 12).

Table 12. The Standard Percentile Rank Corresponding to the Raw Score in the Speed and Accuracy Passing Test

Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank
24	100	20	66.67	17	33.33
22	88.89	19	55.56	16	22.22
21	77.78	18	44.44	15	11.11

The highest raw scores in the Spot-up shooting Test, which measures outside shots skill, were 16 shots, corresponding to the percentile rank of 100, which represents the highest performance. Moreover, the lowest raw scores were 1 shot, corresponding to the percentile rank of 6.67, representing the lowest performance (Table 13).

Table 13. The Standard Percentile Rank Corresponding to the Raw Score in the Spot-Up Shooting Test

Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank
16	100	10	73.33	6	46.67	2	13.33
14	93.33	9	66.67	5	40	1	6.67
13	86.67	8	60	4	33.33		
11	80	7	53.33	3	23.33		

The highest raw scores in the Shooting from close to the Basket Test, which measures inside shots skill, were 37 points, corresponding to the percentile rank of 100, which represents the highest performance. On the other hand, the lowest raw scores were 15 points, corresponding to the percentile rank of 6.25, representing the lowest performance (Table 14).

Table 14. The Standard Percentile Rank Corresponding to the Raw Score in the Shooting from Close to the Basket Test

Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank
37	100	30	75	25	50	18	25
36	93.75	29	68.75	24	43.75	17	18.75
34	87.50	28	62.50	22	37.50	16	12.50
32	81.25	26	56.25	20	31.25	15	6.25

The highest raw scores in the Rebound shooting task Test, which measures offensive rebound skill, were 18 shots, corresponding to the percentile rank of 100, which represents the highest performance. On the other hand, the lowest raw scores were 5 shots, corresponding to the percentile rank of 8.33, representing the lowest performance (Table 15).

Table 15. The Standard Percentile Rank Corresponding to the Raw Score in the Rebound Shooting Task Test

Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank
18	100	13	66.67	8	33.33
16	91.67	12	58.33	7	25
15	83.33	11	50	6	16.67
14	75	10	41.67	5	8.33

The highest raw scores in the Moving without the Ball Test, which measures offensive footwork moves without a ball skill, were 15 seconds, corresponding to the percentile rank of 100, which represents the highest performance. Moreover, the lowest raw scores were 20 seconds, corresponding to the percentile rank of 6.25, representing the lowest performance (Table 16).

Table 16. The Standard Percentile Rank Corresponding to the Raw Score in the Moving Without the Ball Test

Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank
15	100	15.78	75	17	50	17.59	25
15.04	93.75	16	68.75	17.35	43.75	17.66	18.75
15.13	87.50	16.45	62.50	17.48	37.50	18	12.50
15.14	81.25	16.91	56.25	17.53	31.25	20	6.25

The highest raw scores in the Defense against Dribbler Test, which measures defensive pressure, were 11.45 seconds, corresponding to the percentile rank of 100, which represents the highest performance. Furthermore, the lowest raw scores were 15.26 seconds, corresponding to the percentile rank of 3.57, representing the lowest performance (Table 17).

Table 17. The Standard Percentile Rank Corresponding to the Raw Score in the Defense Against Dribbler Test

Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank
11.45	100	12.50	75	12.98	50	13.88	25
11.50	96.43	12.63	71.43	13.23	46.43	14	21.43
11.55	92.86	12.70	67.86	13.45	42.86	14.68	17.86
11.60	89.29	12.73	64.29	13.73	39.29	14.69	14.29
12	85.71	12.90	60.71	13.80	35.71	14.88	10.71
12.13	82.14	12.94	57.14	13.85	32.14	15	7.14
12.26	78.57	12.95	53.57	13.87	28.57	15.26	3.57

The highest raw scores in the Defensive Rebound Test, which measures defensive rebound, were 10 rebounds, corresponding to the percentile rank of 100, which represents the highest performance. On the other hand, the lowest raw scores were 3 rebounds, corresponding to the percentile rank of 12.50, representing the lowest performance (Table 18).

Table 18. The Standard Percentile Rank Corresponding to the Raw Score in the Defensive Rebound Test

Raw degree	percentile rank	Raw degree	percentile rank
10	100	6	50
9	87.50	5	37.50
8	75	4	25
7	62.50	3	12.50

The highest raw scores in the Block Shots Test, which measures block shots, were 33 degrees, corresponding to the percentile rank of 100, which represents the highest performance. Moreover, the lowest raw scores were 10 degrees, corresponding to the percentile rank of 5.88, representing the lowest performance (Table 19).

Table 19. The Standard Percentile Rank Corresponding to the Raw Score in the Block Shots Test

Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank
33	100	25	70.59	20	41.18	12	11.76
30	94.12	24	64.71	19	35.29	10	5.88
28	88.24	23	58.82	18	29.41		
27	82.35	22	52.94	15	23.53		
26	76.47	21	47.06	14	17.65		

According to the Table 20, it is evident that players who scored 80 or higher in the raw scores achieved an excellent level of performance in the Dribble skill Test with its entire types, players who scored between 78 and 79 in the raw scores demonstrated a very good level, players who scored between 74 and 77 in the raw scores displayed a good level, the above-average performance level was observed for players who scored between 68 and 73 in the raw scores, The average performance level was attributed to players who scored between 64 and 67 in the raw scores. On the other hand, the weak performance level was associated with scores ranging from 61 to 63 in the raw scores. Lastly, the very poor performance level was indicated by scores of 60 or below in the raw scores.

Table 20 also illustrates that players who scored 23 points or more in the raw scores achieved an excellent level of performance in the Speed and accuracy passing Test, players who scored 22 points in the raw scores demonstrated a very good level, players who scored 21 points in the raw scores displayed a good level, the above-average performance level was observed for players who scored 20 points in the raw scores, The average performance level was attributed to players who scored 19 points in the raw scores. Furthermore, the weak performance level was associated with 18 points in the raw scores. Ultimately, the very poor performance level was indicated as 17 points or less in the raw scores.

Tale 20 clarifies that players who scored 14 success shots or more in the raw scores achieved an excellent level of performance in the Spot-up shooting Test, players who scored success shots between 11 and 13 in the raw scores demonstrated a very good level, players who scored

10 success shots in the raw scores displayed a good level, the above-average performance level was observed for players who scored success shots between 8 and 9 in the raw scores, The average performance level was attributed to players scored got 7 success shots in the raw scores. Moreover, the weak performance level was associated with success shots from 5 to 6 in the raw scores. Lastly, the very poor performance level was indicated as 4 success shots or less in the raw scores.

Table 20. Standardized Percentile Levels for Technical Tests (n=57)

Standard levels	percentile degree	Dribble skill Test with its entire types	Speed and accuracy passing Test	Spot-up shooting Test	Shooting from close to the Basket Test	Rebound shooting task Test
		Raw degree (deg)	Raw degree (Pt)	Raw degree (n)	Raw degree (Pt)	Raw degree (n)
Excellent	90 or more	80 or more	23 or more	14 or more	35 or more	16 or more
Very good	80 – 89.99	78 - 79	22	11 - 13	32 - 34	15
Good	70 – 79.99	74 - 77	21	10	30 - 31	14
Above-average	60 – 69.99	68 - 73	20	8 - 9	28 - 29	13
Average	50 – 59.99	64 - 67	19	7	25 - 27	11 – 12
Weak	40 – 49.99	61 - 63	18	5 - 6	23 - 24	10
poor	39.99 or less	60 or less	17 or less	4 or less	22 or less	9 or less

Tale 20 clarifies also that players who scored 35 points or more in the raw scores achieved an excellent level of performance in the Shooting from close to the Basket Test, players who scored points between 32 and 34 in the raw scores demonstrated a very good level, players who scored points between 30 and 31 in the raw scores displayed a good level, the above-average performance level was observed for players who scored points between 28 and 29 in the raw scores, The average performance level was attributed to players who scored points between25 and 27 in the raw scores. On the other hand, the weak performance level was associated with points from 23 to 24 in the raw scores. Finally, the very poor performance level was indicated as 22 points or less in the raw scores.

As well, table 20 shows that players who scored 16 success shots or more in the raw scores achieved an excellent level of performance in the Rebound shooting task Test, players who scored 15 success shots in the raw scores demonstrated a very good level, players who scored 14 success shots in the raw scores displayed a good level, the above-average performance level was observed for players who scored 13 success shots in the raw scores, The average performance level was attributed to players who scored success shots between 11 and 12 in the raw scores. Moreover, the weak performance level was associated with 10 success shots in the raw scores. Lastly, the very poor performance level was indicated as 9 success shots or less in the raw scores.

Table 21 is evident that players who achieved a time of 15.04 seconds or less in the raw scores achieved an excellent level of performance in the Moving without the Ball Test, Players who achieved times between 15.14 and 15.05 seconds in the raw scores demonstrated a very good level, Players who achieved times between 15.78 and 15.15 seconds in the raw scores displayed a good level, the above-average performance level was observed for Players who achieved times between 16.45 and 15.79 seconds in the raw scores, The average performance level was attributed to Players who achieved times between 17 and 16.46 seconds in the raw scores. On the other hand, the weak performance level was associated with seconds ranging from 17.35 to 17.01 in the raw scores. Lastly, the very poor performance level was indicated by the time of 17.36 seconds or more in the raw scores.

Table 21. Follow Standardized Percentile Levels for Technical Tests (n=57)

Standard levels	percentile degree	Moving without the ball Test	Defense Against Dribbler Test	Defensive Rebound Test	Block shots Test
		Raw degree (s)	Raw degree (s)	Raw degree (n)	Raw degree (deg)
Excellent	90 or more	15.04 or less	11.55 or less	10	30 or more
Very good	80 – 89.99	15.14 – 15.05	12.13 – 11.56	9	27 – 29
Good	70 – 79.99	15.78 – 15.15	12.63 – 12.14	8	25 – 26
Above-average	60 – 69.99	16.45 – 15.79	12.90 – 12.64	7	24
Average	50 – 59.99	17 – 16.46	12.98 – 12.91	6	22 – 23
Weak	40 – 49.99	17.35 – 17.01	13.45 – 12.99	5	20 – 21
poor	39.99 or less	17.36 or more	13.46 or more	4 or less	19 or less

Table 21 also illustrates that players who achieved a time of 11.55 seconds or less in the raw scores achieved an excellent level of performance in the Defense Against Dribbler Test Players who achieved times between 12.13 and 11.56 seconds in the raw scores demonstrated a very good level, Players who achieved times between 12.63 and 12.14 seconds in the raw scores displayed a good level, the above-average performance level was observed for Players who achieved times between 12.90 and 12.64 seconds in the raw scores, The average performance level was attributed to Players who achieved times between 12.98 and 12.91 seconds in the raw scores. Furthermore, the weak performance level was associated with seconds ranging from 13.45 to 12.99 in the raw scores. Ultimately, the very poor performance level was indicated by the time of 13.46 seconds or more in the raw scores.

Tale 21 clarifies that players who achieved 10 success rebounds in the raw scores achieved an excellent level of performance in the Defensive Rebound Test, players who achieved 9 success rebounds in the raw scores demonstrated a very good level, players who achieved 8 success rebounds in the raw scores displayed a good level, the above-average performance level was observed for players who achieved 7 success rebounds in the raw scores, The average performance level was attributed to players who achieved 6 success rebounds in the raw scores. Moreover, the weak performance level was associated with 5 success rebounds in the raw

scores. Lastly, the very poor performance level was indicated as 4 success rebounds or less in the raw scores.

As well, table 21 shows that players who scored 30 or higher in the raw scores achieved an excellent level of performance in the Block shots Test, players who scored between 27 and 29 in the raw scores demonstrated a very good level, players who scored between 25 and 26 in the raw scores displayed a good level, the above-average performance level was observed for players who scored 24 in the raw scores, The average performance level was attributed to players who scored between 22 and 23 in the raw scores. Moreover, the weak performance level was associated with scores ranging from 20 to 21 in the raw scores. Finally, the very poor performance level was indicated by scores of 19 or below in the raw scores.

2. Standard Levels of Physical Tests:

The highest raw score recorded in the Illinois Agility Test, which measures agility, was 15 seconds, corresponding to the percentile rank of 100, which represents the highest performance. Moreover, the lowest raw score was 20.68 seconds, corresponding to the percentile rank of 4.35, and it represents the lowest performance (Table 22).

Table 22. The Standard Percentile Rank Corresponding to the Raw Score in the Illinois Agility Test

Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank
15	100	17.10	73.91	17.97	47.83	19	21.74
15.23	95.65	17.24	69.57	18	43.48	19.21	17.39
16	91.30	17.35	65.22	18.33	39.13	19.54	13.04
16.05	86.96	17.49	60.87	18.47	34.78	20.09	8.70
16.62	82.61	17.60	56.52	18.70	30.43	20.68	4.35
17	78.26	17.80	52.17	18.77	26.09		

The highest raw score recorded in the 10-meter Sprint Test, which measures acceleration, was 1.61 seconds, corresponding to the percentile rank of 100, which represents the highest performance. Furthermore, the lowest raw score was 2.95 seconds, corresponding to the percentile rank of 3.45, and it represents the lowest performance (Table 23).

Table 23. The Standard Percentile Rank Corresponding to the Raw Score in the 10-Meter Sprint Test

Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank
1.61	100	1.96	72.41	2.14	44.83	2.46	17.24
1.73	96.55	1.97	68.97	2.18	41.38	2.50	13.79
1.82	93.10	1.98	65.52	2.20	37.93	2.55	10.34
1.83	89.66	2.01	62.07	2.21	34.48	2.74	6.90
1.86	86.21	2.04	58.62	2.32	31.03	2.95	3.45
1.90	82.76	2.05	55.17	2.34	27.59		
1.92	79.31	2.10	51.72	2.35	24.14		
1.95	75.86	2.11	48.28	2.41	20.69		

The highest raw score recorded in the 5-0-5 meter Sprint Test, which measures deceleration, was 1.60 seconds, corresponding to the percentile rank of 100, which represents the highest performance. On the other hand, the lowest raw score was 3.41 seconds, corresponding to the percentile rank of 3.13, and it represents the lowest performance (Table 24).

Table 24. The Standard Percentile Rank Corresponding to the Raw Score in the 5-0-5 Meter Sprint Test

Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank
1.60	100	2.62	75	2.89	50	3.08	25
1.90	96.88	2.63	71.88	2.90	46.88	3.09	21.88
2.09	93.75	2.67	68.75	2.93	43.75	3.16	18.75
2.34	90.63	2.70	65.63	2.95	40.63	3.20	15.63
2.41	87.50	2.82	62.50	2.96	37.50	3.24	12.50
2.48	84.38	2.84	59.38	3.00	34.38	3.28	9.38
2.60	81.25	2.87	56.25	3.02	31.25	3.34	6.25
2.61	78.13	2.88	53.13	3.04	28.13	3.41	3.13

The highest raw score recorded in the 20-meter Sprint Test, which measures speed for short distances, was 3.14 seconds, corresponding to the percentile rank of 100, which represents the highest performance. Moreover, the lowest raw score was 4.75 seconds, corresponding to the percentile rank of 3.13, and it represents the lowest performance (Table 25).

Table 25. The Standard Percentile Rank Corresponding to the Raw Score in the 20-Meter Sprint Test

Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank
3.14	100	3.39	75	3.68	50	3.98	25
3.20	96.88	3.49	71.88	3.80	46.88	4.05	21.88
3.22	93.75	3.52	68.75	3.81	43.75	4.07	18.75
3.24	90.63	3.53	65.63	3.85	40.63	4.19	15.63
3.25	87.50	3.57	62.50	3.90	37.50	4.28	12.50
3.32	84.38	3.62	59.38	3.92	34.38	4.37	9.38
3.33	81.25	3.64	56.25	3.94	31.25	4.45	6.25
3.37	78.13	3.66	53.13	3.97	28.13	4.75	3.13

The highest raw score recorded in the 28-meter Sprint Test, which measures speed for relatively long distances, was 4.51 seconds, corresponding to the percentile rank of 100, which represents the highest performance. Furthermore, the lowest raw score was 6.40 seconds, corresponding to the percentile rank of 2.86, and it represents the lowest performance (Table 26).

Table 26. The Standard Percentile Rank Corresponding to the Raw Score in the 28-Meter Sprint Test

Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank
4.51	100	4.89	74.29	5.17	48.57	5.47	22.86
4.56	97.14	4.90	71.43	5.22	45.71	5.68	20
4.57	94.29	4.96	68.57	5.24	42.86	5.69	17.14
4.62	91.43	4.97	65.71	5.25	40	5.70	14.29
4.63	88.57	4.98	62.86	5.27	37.14	5.86	11.43
4.71	85.71	5.03	60	5.28	34.29	5.89	8.57
4.78	82.86	5.05	57.14	5.30	31.43	6.23	5.71
4.82	80	5.09	54.29	5.37	28.57	6.40	2.86
4.86	77.14	5.15	51.43	5.38	25.71		

The highest raw score recorded in the Vertical jump Test, which measures legs power, was 50 centimeters, corresponding to the percentile rank of 100, which represents the highest performance. On the other hand, the lowest raw score was 23 centimeters, corresponding to the percentile rank of 6.25, and it represents the lowest performance (Table 27).

Table 27. The Standard Percentile Rank Corresponding to the Raw Score in the Vertical Jump Test

Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank
50	100	39	75	33	50	29	25
48	93.75	38	68.75	32	43.75	28	18.75
45	87.50	37	62.50	31	37.50	25	12.50
40	81.25	34	56.25	30	31.25	23	6.25

The highest raw score recorded in the Push 3kg Medicine Ball Test with right-hand, which measures right-hand power, was 10 meters, corresponding to the percentile rank of 100, which represents the highest performance. Moreover, the lowest raw score was 5.40 meters, corresponding to the percentile rank of 3.70, and it represents the lowest performance (Table 28).

Table 28. The Standard Percentile Rank Corresponding to the Raw Score in the Push 3kg Medicine Ball Test with Right-Hand

Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank
10	100	8.85	74.07	8	48.15	7	22.22
9.70	96.30	8.80	70.37	7.80	44.44	6.90	18.52
9.50	92.59	8.50	66.67	7.60	40.74	6.70	14.81
9.20	88.89	8.40	62.96	7.50	37.04	6	11.11
9.10	85.19	8.30	59.26	7.45	33.33	5.50	7.41
9	81.48	8.20	55.56	7.30	29.63	5.40	3.70
8.90	77.78	8.10	51.85	7.10	25.93		

The highest raw score recorded in the Push 3kg Medicine Ball Test with the left-hand, which measures left-hand power, was 8.60 meters, corresponding to the percentile rank of 100, which represents the highest performance. Furthermore, the lowest raw score was 3.50 meters, corresponding to the percentile rank of 4, and it represents the lowest performance (Table 29).

Table 29. The Standard Percentile Rank Corresponding to the raw Score in the Push 3kg Medicine Ball Test with Left-Hand

Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank
8.60	100	7.20	72	6.60	44	5.05	16
8.05	96	7.10	68	6.50	40	4.80	12
7.90	92	6.95	64	6.30	36	4.60	8
7.70	88	6.90	60	6.10	32	3.50	4
7.50	84	6.80	56	6	28		
7.40	80	6.75	52	5.30	24		
7.30	76	6.65	48	5.10	20		

The highest raw score recorded in the Push-Up Test, which measures hands strength, was 47 repeats, corresponding to the percentile rank of 100, which represents the highest performance. On the other hand, the lowest raw score was 2 repeats, corresponding to the percentile rank of 4.55, and it represents the lowest performance (Table 30).

Table 30. The Standard Percentile Rank Corresponding to the Raw Score in the Push-Up Test

Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank	Raw degree	percentile rank
47	100	30	72.73	21	45.45	9	18.18
44	95.45	29	68.18	20	40.91	4	13.64
40	90.91	27	63.64	18	36.36	3	9.09
38	86.36	25	59.09	17	31.82	2	4.55
35	81.82	24	54.55	16	27.27		
31	77.27	23	50	10	22.73		

Table 31 is evident that players who achieved a time of 16 seconds or less in the raw scores achieved an excellent level of performance in the Illinois Agility Test, Players who achieved times between 16.62 and 16.01 seconds in the raw scores demonstrated a very good level, players who Players who achieved times between 17.10 and 16.63 seconds in the raw scores displayed a good level, the above-average performance level was observed for Players who achieved times between 17.49 and 17.09 seconds in the raw scores, The average performance level was attributed to Players who achieved times between 17.80 and 17.50 seconds in the raw scores. On the other hand, the weak performance level was associated with seconds ranging from 18 to 17.81 in the raw scores. Lastly, the very poor performance level was indicated by the time of 18.01 seconds or more in the raw scores.

Table 31 also illustrates that players who achieved a time of 1.82 seconds or less in the raw scores achieved an excellent level of performance in the 10-meter Sprint Test, Players who achieved times between 1.90 and 1.83 seconds in the raw scores demonstrated a very good

level, Players who achieved times between 1.96 and 1.91 seconds in the raw scores displayed a good level, the above-average performance level was observed for Players who achieved times between 2.01 and 1.97 seconds in the raw scores, The average performance level was attributed to Players who achieved times between 2.10 and 2.02 seconds in the raw scores. Furthermore, the weak performance level was associated with seconds ranging from 2.18 to 2.11 in the raw scores. Ultimately, the very poor performance level was indicated by the time of 2.19 seconds or more in the raw scores.

Table 31. Standardized Percentile Levels for Physical Tests (n=57)

Standard levels	percentile degree	Illinois Agility Test	10-meter Sprint Test	5-0-5 meter Sprint Test	20-meter Sprint Test	28-meter Sprint Test
		Raw degree (s)	Raw degree (s)	Raw degree (s)	Raw degree (s)	Raw degree (s)
Excellent	90 or more	16 or less	1.82 or less	2.34 or less	3.24 or less	4.62 or less
Very good	80 – 89.99	16.62 – 16.01	1.90 – 1.83	2.60 – 2.35	3.33 – 3.25	4.82 – 4.63
Good	70 – 79.99	17.10 – 16.63	1.96 – 1.91	2.63 – 2.61	3.49 – 3.34	4.90 – 4.83
Above-average	60 – 69.99	17.49 – 17.09	2.01 – 1.97	2.82 – 2.64	3.57 – 3.50	5.03 – 4.91
Average	50 – 59.99	17.80 – 17.50	2.10 – 2.02	2.89 – 2.83	3.68 – 3.58	5.15 – 5.04
Weak	40 – 49.99	18 – 17.81	2.18 – 2.11	2.95 – 2.90	3.85 – 3.69	5.25 – 5.16
poor	39.99 or less	18.01 or more	2.19 or more	2.96 or more	3.86 or more	5.26 or more

Tale 31 clarifies that players who achieved a time of 2.34 seconds or less in the raw scores achieved an excellent level of performance in the 5-0-5 meter Sprint Test, Players who achieved times between 2.60 and 2.35 seconds in the raw scores demonstrated a very good level, Players who achieved times between 2.63 and 2.61 seconds in the raw scores displayed a good level, the above-average performance level was observed for players who achieved times between 2.82 and 2.64 seconds in the raw scores, The average performance level was attributed to players who achieved times between 2.89 and 2.83 seconds in the raw scores. Moreover, the weak performance level was associated with seconds ranging from 2.95 to 2.90 in the raw scores. Lastly, the very poor performance level was indicated by the time of 2.96 seconds or more in the raw scores.

Tale 31 clarifies also that players who achieved a time of 3.24 seconds or less in the raw scores achieved an excellent level of performance in the 20-meter Sprint Test, players who achieved times between 3.33 and 3.25 seconds in the raw scores demonstrated a very good level, players who achieved times between 3.49 and 3.34 seconds in the raw scores displayed a good level, the above-average performance level was observed for players who achieved times between 3.57 and 3.50 seconds in the raw scores, The average performance level was attributed to players who achieved times between 3.68 and 3.58 seconds in the raw scores. On the other

hand, the weak performance level was associated with seconds ranging from 3.85 to 3.69 in the raw scores. Finally, the very poor performance level was indicated by the time of 3.86 seconds or more in the raw scores.

As well, table 31 shows that players who achieved a time of 4.62 seconds or less in the raw scores achieved an excellent level of performance in the 28-meter Sprint Test, players who achieved times between 4.82 and 4.63 seconds in the raw scores demonstrated a very good level, players who achieved times between 4.90 and 4.83 seconds in the raw scores displayed a good level, the above-average performance level was observed for players who achieved times between 5.03 and 4.91 seconds in the raw scores, The average performance level was attributed to players who achieved times between 5.15 and 5.04 seconds in the raw scores. Furthermore, the weak performance level was associated with seconds ranging from 5.25 to 5.16 in the raw scores. Ultimately, the very poor performance level was indicated by the time of 5.26 seconds or more in the raw scores.

Table 32. Follow Standardized Percentile Levels for Physical Tests (n=57)

Standard levels	percentile degree	Vertical jump Test	Push 3kg Medicine Ball Test with right-hand	Push 3kg Medicine Ball Test with left-hand	Push up Test
		Raw degree (cm)	Raw degree (m)	Raw degree (m)	Raw degree (reps)
Excellent	90 or more	48 or more	9.50 or more	7.90 or more	40 or more
Very good	80 – 89.99	40 - 47	9 – 9.49	7.40 – 7.89	35 - 39
Good	70 – 79.99	39	8.80 – 8.99	7.20 – 7.39	30 – 34
Above-average	60 – 69.99	37 - 38	8.40 – 8.79	6.90 – 7.19	27 – 29
Average	50 – 59.99	33 – 36	8.10 – 8.39	6.75 – 6.89	23 – 26
Weak	40 – 49.99	32	7.60 – 8.09	6.50 – 6.74	20 – 22
poor	39.99 or less	31 or less	7.59 or less	6.49 or less	19 or less

Table 32 is evident that players who scored 48 centimeters or more in the raw scores achieved an excellent level of performance in the Vertical jump Test, players who scored between 40 and 47 centimeters in the raw scores demonstrated a very good level, players who scored 39 centimeters in the raw scores displayed a good level, the above-average performance level was observed for players who scored between 37 and 38 centimeters in the raw scores, The average performance level was attributed to players who scored between 33 and 36 centimeters in the raw scores. On the other hand, the weak performance level was associated with 32 centimeters in the raw scores. Lastly, the very poor performance level was indicated by a score of 31 centimeters or less in the raw scores.

Table 32 also illustrates that players who scored 9.50 meters or more in the raw scores achieved an excellent level of performance in the Push 3kg Medicine Ball Test with right-hand, players who scored between 9 and 9.49 meters in the raw scores demonstrated a very good level, players who scored between 8.80 and 8.99 meters in the raw scores displayed a good level, the above-average performance level was observed for players who scored between 8.40 and 8.79 meters in the raw scores, The average performance level was attributed to players who

scored between 8.10 and 8.39 meters in the raw scores. Furthermore, the weak performance level was associated with meters ranging from 7.60 to 8.09 in the raw scores. Ultimately, the very poor performance level was indicated by a score of 7.59 meters or less in the raw scores.

Tale 32 clarifies that players who scored 7.90 meters or more in the raw scores achieved an excellent level of performance in the Push 3kg Medicine Ball Test with left-hand, players who scored between 7.40 and 7.89 meters in the raw scores demonstrated a very good level, players who scored between 7.20 and 7.39 meters in the raw scores displayed a good level, the above-average performance level was observed for players who scored between 6.90 and 7.19 meters in the raw scores, The average performance level was attributed to players who scored between 6.75 and 6.89 meters in the raw scores. Moreover, the weak performance level was associated with meters ranging from 6.50 to 6.74 in the raw scores. Lastly, the very poor performance level was indicated by a score of 6.49 meters or less in the raw scores.

As well, table 32 shows that players who scored 40 repetitions or more in the raw scores achieved an excellent level of performance in the Push up Test, players who scored between 35 and 39 repetitions in the raw scores demonstrated a very good level, players who scored between 30 and 34 repetitions in the raw scores displayed a good level, the above-average performance level was observed for players who scored between 27 and 29 repetitions in the raw scores, The average performance level was attributed to players who scored between 23 and 26 repetitions in the raw scores. Furthermore, the weak performance level was associated with repetitions ranging from 20 to 22 in the raw scores. Finally, the very poor performance level was indicated by a score of 19 repetitions or less in the raw scores.

Discussion

1. Key Technical Determinants

Tables 2 and 4 led to the identification of the main technical determinants for various playing positions in basketball, achieving a percentage of 80% or higher. These determinants are as follows: position 1 in offense (dribbling skills and ball control, passing skills, outside shots), and in defense (defensive pressure); position 2 in offense (outside shots, moving without the ball, dribbling skills and ball control), and in defense (defensive pressure); position 3 in offense (Inside and outside shots), and in defense (defensive rebound); position 4 in offense (Inside and outside shots, offensive rebound), and in defense (defensive rebound), position 5 in offense (inside shots, offensive rebound), and in defense (defensive rebound, block shots).

From these findings, the researcher considers that each playing position has major and distinct technical determinants that distinguish the position in a way that is higher than the rest of the other positions.

The obtained results are in agreement with Schleyer (2019) who indicates that each position has unique responsibilities and requires a specific set of skills.

Moreover, Sindik (2011) assumed that there are distinct roles, tasks, and technical and tactics determinants for each position that must be performed when playing.

We find that the position 1 and 2 were characterized by ball control skill and dribble skills as a major offensive technical determinant. The researcher suggests that this emphasis stems from the role of position 1 in moving the ball from the backcourt to the frontcourt, so he must master this skill in order to be able to attack and bypass the defending players without losing the ball. Also, position 2 is characterized by the same feature, which is the skill of controlling the ball and skills of dribble, but not to the same degree of excellence as position 1, as it most often plays the role of position 1 if it is absent in the court.

This is consistent with what Vancil (1995) referred to, The point guard is usually the best player in ball control, dribble and passing, as his role is to move the ball to the front court and start the attack, and the shooting guard is characterized by ball control, dribble and starting the attack, but not as distinguished as the point guard.

We also find from the results that position 1 is characterized by passing skills as a major offensive technical determinant, and she attributes that due to the point guard beginning the attack process and implementing the plans on the court, so the first pass from him, so it is necessary to master the passing skills in order for the ball to reach the rest of his colleagues, and Game plans are executed without cutting or losing the ball.

Indeed, both Krause, Meyer and Meyer (2008) indicate, that the point guard can create a shooting opportunity for his teammates by passing the ball to an unattended teammate.

The results also show that the first four positions: the point guard, the shooting guard, the small forward, and the power forward are distinguished by outside shots as a major offensive technical determinant. This is due to the places of movement of the position players (1, 2, and 3) and their presence most of the time in the game outside the arc of 6.75 meters. Therefore, they must master this type of shooting so that they can achieve the goal of the basketball game, which is to score points. It is also due that position 4 has become good at shooting from outside the arc, because in modern basketball, the field of movement of this player has become outside the arc, so he must be good at this type of shooting.

These findings agree with Stimpson and Taylor (1996), indicating that the guards (point and shooting) and the small forward striker play far from the basket, and therefore they must be good at shooting from long distances compared to the rest of the players.

Mac (2021) mentioned that in today's basketball game, the power forward needs to make good shots from mid-range and three-point shots.

It is also clear from the results that position 2 is distinguished by moving without the ball as a major offensive technical determinant. This is attributed to the fact that the shooting guard is very good at shooting, so he must be proficient in moving without the ball by using offensive foot movements to escape from the control of the defender and move to an open place He can receive the ball and shoot.

In this regard, Rose (2013) points out that the shooting guard has a high scoring rate, and is characterized by cutting and changing directions to get rid of the opponent in order to create an opportunity for himself to receive the ball and shoot.

Cornberg (2021) mentioned that the shooting guard must have the ability to move in the court without the ball to open up an opportunity to shoot.

The results show that positions 3, 4 and 5 are distinguished by inside shots as a major offensive technical determinant. This is attributed to the fact that position 3 is a cutting player who is characterized by cuts towards the basket in a high way, and therefore he can receive balls and shoot, whether these shots are medium or close to the basket. Also, the positions 4 and 5 are good at moving and playing in the paint area, so they can also receive passes and shoot, whether from medium distances inside the arc or shots close to the basket.

This is consistent with Cornberg (2021) mentions that when the small forward plays in the offense, he advances and cuts toward the paint area to put himself in a position to receive the easy pass and shots medium or close to the basket.

Lab (2021) points out in this regard, that positions 4 and 5 are good at shooting from inside the arc, usually receive passes and play with the back towards the basket to score from medium or close distances.

Results also showed that positions 4 and 5 are characterized by an offensive rebound as a major offensive technical determinant. This is due to the large presence of these two positions inside the arc when they play, usually by forming three players outside and two players inside, so it is easy for them to complete the shooting because of their height and proximity to the basket, so they can jump to take possession of the ball and then follow-up with an offensive rebound to score the point.

This comports with what Vancil (1995) indicated, that positions 4 and 5 are usually taller and stronger than the rest of the players, so they can get rebound balls and supplement them with an offensive rebound.

Moreover, this complies with what Stimpson and Taylor (1996) referred to, those pivot players are the tallest and play close to the basket, so they are good at close shooting and offensive rebound.

It is clear from the results that positions 1 and 2 are distinguished by defensive pressure as a major defensive technical determinant. This is due to the fact that these two positions are distinguished by their speed in transitioning from the offensive process to the defense .So they become the first line of defense and work on applying pressing defense to hinder the opponent's penetration and reduce their speed. This allows the rest of the defensive team members to move to the back half of the court and organize their defensive positions.

These findings agree with what Bianchi et al., (2017) referred to, that both point guard and shooting guard players are well defensive-minded, their role in defense is to stop the best players of the opposing team by using defensive pressure.

Mac (2021) also mentions in this regard that a point guard player is able to read what the defense is doing and makes smart decisions that limit their attack, as he is responsible for guarding and disrupting the opponent's main ball player. Also, the shooting guard player is responsible for guarding the shooting guard player and is able to avoid screens from larger opponents, and these two positions do this by playing defensive pressure.

The results also show that the players at the positions of small forward, power forward, and center are distinguished by defensive rebound skill as a major defensive technical determinant. This is attributed to their roles in forming a strong defensive presence near the basket when the opposing team takes a shot. Positions 3, 4, and 5, being taller than positions 1 and 2, have an advantage in acquiring rebounds and executing successful defensive rebounds. Their height and positioning allow them to effectively contest for rebounds and secure possession for their team.

In this regard, Lab (2021) points out that positions small forward, power forward, and center are the tallest players on the team, and they are good at grabbing rebounds and passing them to positions players 1 and 2 to start a fast break.

Sindik (2011) also mentioned that positions players' small forward, power forward, and center are usually the tallest positions, and they lead their team in rebounding balls.

Also, the results show that position center is distinguished by blocking shots skill as a major defensive technical determinant. This is due to the distinction of the player of this position with his tall stature, the massiveness of his body, being in the paint area and being close to the basket. All of these factors qualify him greatly to make him a distinguished player in blocking shots.

This agrees with what Cornberg (2021) indicated that the position players' center uses his height and place to block players and force them to take difficult shots from the perimeter, as he is the main player in the team to block shots.

Mac (2021) also notes that position player 5 spends most of their playing time near the basket so they can block shots effectively.

Through these findings from Tables 2-4, we find that the first question has been achieved.

2. Key Physical Determinants

Tables 3 and 5 led to the identification of the main physical determinants for various playing positions in basketball, achieving a percentage of 80% or higher. These determinants are as follows: position 1 (agility, acceleration, legs and arms power, speed "short distances", and deceleration); position 2 (acceleration, legs and arms power, speed "relatively long distances", and agility); position 3 (legs and arms power, speed "relatively long distances", and agility); position 4 and 5 (legs power and arms strength).

From these findings, the researcher considers that the major physical determinants differ from one position to another, according to the requirements of the position in the court.

These results are in agreement with what Kucsa and Mačura (2015) indicate that each of the playing positions has its own distinctive physical characteristics, as studies have shown great differences between the playing positions in terms of body size, speed, agility, and maximum oxygen consumption.

We find that position 1 is characterized by speed for short distances as a major physical determinant. The researcher attributes this due to that position 1 mostly moves in the area between the back half-court for his team until the top of the key area of the front half-court from outside the arc. On the other hand positions 2 and 3 are characterized by speed for relatively long distances as a major physical determinant. As positions 2, and 3 are cutter players, which means they are distinguished by cutting towards the basket and entering the paint area, which requires them to cover relatively longer distances compared to position 1

These findings are consistent with what Abdelkrim et al. (2010) indicated; Point guards perform better in movement and speed for a short distance, while shooting guards and small forwards are faster during 30-meter sprints because their position requires them to cover Long distances (e.g. the full court).

We also find from the results that the first three playing positions are distinguished by the element of agility as a major physical determinant. The researcher attributes this to the fact that the first playing positions 1, 2 and 3 move and change their direction in order to escape from the opponent and try to find a suitable place to cut on it for shoot.

This comes in agreement with Köklü et al. (2011), pointing that guards and forward (positions 1, 2, and 3) showed superior performance in speed and agility compared to the rest of the centers.

Delextrat and Cohen (2009) study results, state that guards and forwards are better than pivot players in the element of agility.

The results also show that position 1 is distinguished by acceleration and deceleration as major physical determinants. This can be attributed to the fact that players of position 1 move the ball from the back half-court to the front half-court, and in most cases, they have a pressing defense from the player of the opposing team, so he must be distinguished by acceleration and deceleration so that he can adjust the speed of play as well as fake the player who follows and escape from him successfully. The position player 2 is also distinguished by the element of acceleration as a major physical determinant such as position 1, and this attributes to the fact that the position player 2 is characterized by offense movement skill without the ball to escape from the opponent to reach the appropriate place to receive the ball and shoot, so he needs to be distinguished by the element of acceleration. Also, these two positions 1 and 2 represent the first line of defense for the team, so they must be distinguished by the element of acceleration, which means the ability to produce high speeds in the least possible distance from a steady or moving start, so that they can stop and limit the progress of the players of the opposing team.

This is consistent with Abdelkrim et al. (2010) mention that the point guard game task is to start the attack process and adjust the speed of play, and therefore acceleration and deceleration must be provided in offensive and defensive tasks during competition.

Reina et al. (2019) asserts that guards need the element of acceleration and deceleration, whether in offense or defense, as they need these two elements in the offense, when making a change of directions, sudden movements, changes in speed, and all this in order to destabilize their opponents and escape from them, and in defense, they appear in their follow-up and monitoring of their likes from the guards from the opposing team.

The results also indicate that there are no differences between the five playing positions in the level of legs power, as they are characterized by the component of legs power as a major physical determinant. The researcher attributes this to the necessity of legs power element for all playing positions, as it appears legs power is greatly used for playmaker (position 1) and cutter (positions 2 and 3) in jump shots from long or medium distances, as well as the use of legs power for the pivot (positions 4 and 5) Significantly in collecting rebounds to make offensive or defensive follow-ups, and it also appears in blocking shots.

This comes in agreement with Ziv and Lidor (2009), pointing out that legs power represented in vertical jumps is among the most common actions that all basketball players perform in both defense (such as blocking and rebounding) and offense (such as shooting and rebounding).

Delextrat and Cohen (2009) state that, the power of the lower extremity measured through the vertical jump test shows contradictory results between studies. Some studies show that there are no differences in the height of the vertical jump between positions, as all positions need to jump, especially jump shots from the outside for guards and Small forward players, and rebounds for the power forward and center players. While other studies reported significantly better performance in the first playing positions 1, 2 and 3 compared to the rest of the positions.

In addition, the results show that there are differences in the component of arms power between the playing positions, as the first playing positions 1, 2 and 3 are distinguished by arms power, while the positions players 4 and 5 are characterized by arms strength as a major physical determinant. This attributes to the need for strength and speed elements at the same time in the player's positions 1, 2 and 3, because most of their shots are from long distances that require this mixture, while positions 4 and 5 need more arms strength element to be used largely in screens, blocking and rebounds.

In this regard, Ziv and Lidor (2009) point out that upper body strength can be more important in some playing positions, such as power forward (position 4) and center (position 5).

Abbas and Abbas (2012) indicate that the positions of playmaker and cutter are distinguished by arms power, "the strength that is distinguished by speed," and that this power came to its importance from the nature of the tasks of these players in shooting from the outside.

Through these findings from Tables 3-5, we find that the second question has been achieved.

3. Tests that measure these technical and physical determinants and their standard levels

Tables 6 and 7 led to the identification of the appropriate tests to measure the main technical and physical determinants needed to select players in an objective manner for the various playing positions in basketball, as follows:

- The technical tests are, (Dribble Skill with its entire Types Test) measuring dribble skills and ball control, (Speed and Accuracy Passing Test) measuring pass skill, (Spot Up Shooting Test) measuring outside shots, (Shooting From Close to the Basket Test)

measuring inside shots, (Rebound Shooting Task Test) measuring offensive rebound, (Moving Without the Ball Test) measuring offensive footwork moves without a ball, (Defense Against Dribbler Test) measuring defense pressure and the speed of defensive movements, (Defensive Rebound Test) measuring defensive rebound, (Block Shots Test) measuring block shots.

- The physical tests are, (Illinois Agility Test) measuring agility, (10-meter Sprint Test) measuring acceleration, (5-0-5 meter Sprint Test) measuring deceleration, (20-meter Sprint Test) measuring speed for a short distance, (28-meter Sprint Test) measuring speed for a relatively long distance, (Vertical Jump Test) measuring the legs power, (Push Up Test) measuring the arms strength, (Pushing a Medicine Ball Test) measuring the arms power.

The researcher indicates the need for coaches to use these specific and objective tests to measure the main physical and skill determinants in a way that is far from self-evaluating, and it's more accurate results can be used to direct and select the players in a more correct way for the appropriate playing positions for them.

In support of this perspective, Pérez-Toledano et al. (2019) indicate, that selecting process of players for playing positions is a very complex process because it is influenced by numerous variables and in many cases is characterized by a great deal of subjectivity.

Drinkwater et al. (2008) confirm that the careful selection of tests and their implementation will yield accurate results that can be used.

Moreover, Cui et al. (2019) mentioned the need for standardized, specific and objective tests in order to help coaches assess and identify the talents and capabilities of players and acquire crucial information that helps them direct players to appropriate playing positions.

Tables 11-19 and 22-30 showed the percentile standards, the highest raw score, the lowest raw score, and the corresponding percentile score for each of the tests used to measure the main technical and physical determinants.

Further, Tables 20-21 and 31-32 yielded the standard levels of those technical and physical tests according to seven standard levels, namely: The excellent level for a score of 90% or more, very good level for a score of 80% to 89.99%, good level for the score of 70% to 79.99%, Above-average level for the score of 60% to 69.99%, the average level for the score of 50% to 59.99%, a weak level for the score of 40% to 49.99%, and very poor level for the score of 39.99% or less.

The researcher emphasized the necessity of having standard levels for those technical and physical tests to determine the level of the players, and based on that they are directed to the appropriate playing positions for their level. As the raw score obtained by the players in the test does not help the coach to determine his level without comparing this score to the standard level and converting it into a score that can be interpreted and used to direct the players to the playing positions that are consistent with their level.

In this regard, Odeh (2016) indicates, that the standard scores have the ability to determine the player's place in his group, as the standard defines the meaning of the score that the player obtained. And that the standards are important in clarifying how the players perform on the test, thus providing a basis for comparison, by converting the raw scores into standard scores to give the results a clear meaning and indication.

Allawi and Radwan (2000) point out that the importance of setting standards is due to the fact that the coach can use these standards to indicate whether the scores of players are at the average level, above-average, or below-average for the sample that was used in building the standards.

Also, she explains that the level of each player in the main and distinctive technical and physical determinants of each position can be calculated through those standard levels for each skill, where if the player obtains a percentage higher than the average level, i.e. with a minimum of 60% to 69.99% in all requirements of the position. This indicates that this center is appropriate to play with.

This agrees with what Trninić and Dizdar (2000) referred to each of the five playing positions in basketball has individual criteria of importance above the average level.

Through these findings from Tables 6-7 and 11-32, we find that the third question has been achieved.

Conclusion

In light of the aim, research questions, methodology used, the sample, and the statistical analysis followed, and based on obtained results, it was concluded that the key technical determinants of position 1 were dribbling skills and ball control, passing skills, outside shots, and defensive pressure; position 2 was outside shots, moving without the ball, dribbling skills, and ball control, defensive pressure; position 3 was inside and outside shots, defensive rebound; position 4 was inside and outside shots, offensive and defensive rebound; and position 5 was inside shots, offensive and defensive rebound, and block shots. Furthermore, the key physical determinants for position 1 were agility, acceleration, legs and arms power, speed "short distance", and deceleration; position 2 was acceleration, legs and arms power, speed "relatively long distance", and agility; position 3 was legs and arms power, speed "relatively long distances", and agility; position 4 and 5 were legs power and arms strength. Also, appropriate tests were shown to measure these determinants: Dribble Skill with its entire Types Test, Speed and Accuracy Passing Test, Spot Up Shooting Test, Shooting From Close to the Basket Test, Rebound Shooting Task Test, Moving Without the Ball Test, Defense Against Dribbler Test, Defensive Rebound Test, Block Shots Test, Illinois Agility Test, 10-m, 20-m, and 28-m Sprint Test, 5-0-5 m Sprint Test, Vertical Jump Test, Push Up Test, and Pushing a Medicine Ball Test. The standard levels of those tests were carried out according to seven levels (excellent for the degree of 90% or more, very good for the degree of 80% to 89.99%, good for the degree of 70% to 79.99%, above-average for the degree of 60% to 69.99%, average for the degree of 50% to 59.99%, weak for the degree of 40% to 49.99%, and very poor for the degree of 39.99% or less), and the player directs to the appropriate playing position if he obtains a percentage above average in all technical and physical requirements of the position at a minimum.

Therefore, the researcher recommends the importance of informing coaches about these key technical and physical determinants for each playing position. So that they can use this information in selecting the players and directing them to each suitable playing position, and thus the choice is effective and achieves the best results.

Standardized objective tests extracted from this research are also recommended to use in the process of testing the players on those key technical and physical determinants characteristic of each playing position and using their standard levels to determine the level of each player in those determinants. Thus through these results, we can direct the players to the appropriate playing position and develop training programs that help to increase the physical ability or technical level of the player in the weak skill or element, as it is a good evaluation tool and can be relied upon by the coaches to help the players to reach the best results.

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