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ANTHROPOMETRIC MEASUREMENTS AND THEIR RELATIONSHIP WITH TECHNICAL SKILLS AND PHYSICAL PERFORMANCE IN JUNIOR BASKETBALL PLAYERS

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Abstract. *Anthropometric features can influence physical performance in pre-adolescent basketballers. On rare occasions, scientific literature has assessed anthropometric changes in performance for this age group. The study aimed to identify the relation between body measurements and skilled-body performance in junior basketballers. The study sample consisted of 60 players from basketball academies in the United Arab Emirates for the sports season 2020-2021. The average age was 14-16 years, with height ranging from 160 to 170 cm. Anthropometric measurements included body mass, length (total/upper/lower body, arm/leg), circumferences (chest/ humeral/ calf circumferences), and shoulder width. Skilled-body performance tests included front shot/ side shot/ free throw/ wall scrolling/ ball-running test, and vertical jump. Equipment used included an electronic balance for weight (in kilograms) and a measuring tape (in centimetres). After collecting the data, using the SPSS statistical program, and the Person correlation for different length, width, and circumferences measurements, results indicated that there were statistically significant links between front, side, and free throw shot with body measurements. Also, the study found a relationship between wall scrolling and ball running speed tests, and measurements of mass, upper body/ arm length, chest/ calf circumferences, and shoulder width. Anthropometric measurements were very important for skills and body tests. In conclusion, anthropometric traits were found to significantly contribute to the skills and performance of pre-adolescence players. Trainers are recommended to consider these traits when selecting junior basketball players. It is also recommended that similar studies be conducted with different age groups and genders to compare and generalize the results to basketball union.*

Keywords: *anthropometrics; measurements; physical performance; basketball.*

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Introduction

Basketball is one of the games holding a prominent position among various sports activities, both in general sports and group activities. Its popularity, whether in terms of practice or spectatorship, rivals that of football in many societies. The use of tests and measurements is essential in the development of basketball as a sport. These tools play a crucial role in advancing the scientific understanding of all sports activities and serve as valuable resources for sports coaches. Tests and measurements provide coaches with insights into the extent of progress and development of players in terms of physical fitness, skill levels, and tactical abilities.

Boddington et al. (2020) noted that tests are not just tools but serve as a realistic source of information for coaches to assess the physical and functional readiness of the players. This information motivates coaches to exert more effort in achieving their training goals and objectives. Bonal et al. (2020) indicates that improving the training process requires the coach to combine their previous playing experience with scientific sports studies.

Like other sports, basketball demands specific fitness components in order to meet the game's requirements effectively. Chiwaridzo et al. (2020) indicates that physical elements play an essential role in sports activities. The nature and type of these physical components vary depending on the sport, contributing to the overall development of players. The physical components serve as the foundation upon which other necessary elements are built, and their development is closely intertwined with the enhancement of motor skills. This is indicated by Erculj, and Štrumbelj (2015), who underscore the significance of special physical fitness components as pivotal pillars of technical performance in basketball. These physical elements form the basis for payers' performance in many game situations and contribute to improving their skilful and tactical abilities. Additionally, they facilitate the rapid acquisition of new skills and help delay the onset of fatigue during extended game durations.

Many studies and scientific research endeavours have focused on basketball as a subject of study with the aim of enhancing various aspects of the game, including strategies, regulations, and both technical and physical performance. This ongoing development has been complemented using devices, tools, and scientific tests. These advancements underscore the significant importance of the basketball game, evident in the evolution witnessed across all aspects of the sport. In the field of anthropometric measurements, many researchers have shown keen interest in determining these anthropometric measurements in accordance with the specific requirements of motor performance in sports activities. This emphasis on anthropometrics serves as a crucial foundation for achieving peak athletic performance and optimizing time and effort. As highlighted by Erculj et al. (2010), anthropometric measurements hold substantial significance across different sports activities, and this importance is grounded in the fact that athletes perform movements with their bodies, and these movements can vary significantly from one player to another, resulting in differences in sports performance.

The problem at the core of this study lies in the observations made by researchers specializing in basketball and anthropometric measurements during the process of selecting young athletes for various sports activities. It is one of the most substantial and critical challenges faced by professionals in this field, as indicated by Hoare (2000), who emphasized that the selection of young basketball players is one of the most important problems encountered by sports personnel worldwide. According to Hoffman et al. (1996), athletes cannot attain high levels of performance in a specific sport unless they possess physical characteristics that are consistent with the requirements of that particular activity. This is consistent with Hoffman and Maresh (2000), who assert that physical measurements significantly influence attributes such as strength, speed, endurance, flexibility, and the body’s response to various environmental conditions. Moreover, these measurements impact and athlete’s physical aptitude and their ability to achieve impressive sports results.

The significance of this study becomes evident when we consider the crucial role that physical measurements play in determining success or failure in sports performance. These measurements can significantly impact an individual's ability to meet the mechanical requirements of skill performance, particularly in the case of basketball players.

This study aimed to find out:

- The key anthropometric measurements that that have an impact on the outcomes of skill-based physical performance tests among junior basketball players.
- The nature and extent of the correlations between the selected anthropometric measurements and the athletes' performance scores achieved in skill-based physical performance tests.

Research questions

- What are the most important anthropometric measurements that contribute to each test of the skilful physical performance of junior basketball players?
- What is the nature and extent of correlation between the selected anthropometric measurements and the players' performance scores in the skilful physical performance tests for junior basketball players?

Methodology

Participants and Procedure

The study sample was chosen according to the intentional method. It comprised 60 junior basketball players, with an average age of 14 to 16 years, and a height ranging from 160 to 170 cm. These players were drawn from various basketball academies, including Al Ain Club, German Sports, Ball for all, Universal School, and Stuttgart Academy.

The researcher conducted anthropometric measurements and tests of skilful physical performance within the timeframe of March 1, 2021, to April 20, 2021.

In adherence to ethical standards, the study obtained parental consent for underage participants. Each player’s parent or guardian completed a data form and provided their signature to grant approval. Table 1 comprises the description of the sample.

Table 1. *Study sample and percentage for each academy*

Academy	Study sample	Percentage of sample for each club
Al Ain club	12	20%
German sports	11	18.33%
Universal school	14	23.33%
Ball for all	11	18.33%
Stuttgart	12	20%
Total	60	100%

Measurements

The data collection process involved the use of various tests and measurement tools on the study sample. The researcher employed the following:

Body measurements:

Weight: The weight was measured using a medical scale in unit (kg) type (seca) made in Germany (Appendix 1).

Lengths: Lengths measurements were taken using a tape measure in centimetres. It included the following parameters (see Appendix 1): The total length of the body, Arm length, Length of the upper end, Length of the lower end, Leg length.

Circumferences and width: Circumference measurements were also recorded in centimetres, using a tape measure, and included the following (see Appendix 1): Chest circumference, Circumference of the upper arm, Circumference of calf (of the leg), Shoulders width.

Skilful physical performance tests (see Appendix 2): Forward shooting, shooting at the basket from the side, shooting from the free throw line, Wall Scrolling Speed, Running with the ball at speed (dribbling) and Vertical jump.

Results

The first question: Which anthropometric measurements hold the greatest significance in influencing the outcomes of skilful physical performance tests among junior basketball players?

Table 2. *Anthropometric measurements contribute to physical and skill tests*

Tests	Anthropometric measurements	Coefficient	Mistake percentage	F value Calculated	f value tabulated ($\alpha \leq 0.05$)	Significant level	Partial Contribution Ratio	Cumulative Contribution Ratio	Constant coefficient
Forward shooting test	Upper arm circumference	0.326	1.84	5.82	4.02	0.019	9.10%	9.10%	13.044
Shooting from the side test	Upper arm circumference	0.544	3.7	4.038	4.02	0.049	6.50%	6.50%	10.57
Free throw line shooting test	Chest circumference	0.199	2.24	6.5	2.78	0.001	11.10%	11.10%	-2.146
	Leg length	0.168	2.17	6.5	2.78	0.001	7.00%	18.10%	-2.146
	Shoulder width	-0.103	2.08	6.5	2.78	0.001	7.70%	25.80%	-2.146
Wall Scrolling Speed Test	Shoulder width	-0.144	0.629	12.86	4.02	0.001	18.20%	18.20%	14.881
Running speed with the ball (dribbling)	Weight	0.054	1.3	11.27	4.02	0.001	16.30%	16.30%	6.006
Vertical jump test	Leg length	0.178	2.59	5.014	3.17	0.010	9.00%	9.00%	40.305
	Calf circumference	-0.238	2.52	5.014	3.17	0.010	6.00%	15.00%	40.305

Table 2 indicates that the calculated value (f) for the variable of forward shooting was (5.82), which is a statistically significant value at the level of significance (0.05), as the tabulated value (f) = 4.02. The upper arm circumference is the only physical measurement that contributes to this test, with a contribution rate of (9.10%). Thus, the equation of the regression line can be formulated as follows: Forward shooting test = (0.326 x upper arm circumference) + 13.044

The value of (f) calculated for the variable test of shooting from the side amounted to 4.038, which is a statistically significant value at the level of significance (0.05), as the tabulated value (f) = 4.02. The upper arm circumference is the only physical measurement that contributes to this test, with a contribution rate of 6.5%. Thus, the regression line equation can be formulated as follows: Shooting from the side test = (0.544 x upper arm circumference) + 10.57

For chest circumference, leg length and shoulder width (the physical measurements that contributed to the performance of the free-throw line shooting test), the value of calculated F was 6.50, which is a statistically significant value when compared to the tabulated value of 2.78. The table indicate that the partial contribution rate for chest circumference reached (11.1%), leg length reached (7.00%) and shoulder width (7.70%). The contribution of these measures combined reached (25.8%). We can formulate the regression line equation as follows:

Free-throw line shooting test = (0.199 x chest circumference) + (0.168 x leg length) - (0.103 x shoulder width) – 2.146.

There are correlations with the free-throw line correction for all measurements: weight, leg length, chest circumference, and shoulder width. Weight gain (increased muscle size) is closely expressed in body circumference.

Table 2 also indicates that the value of calculated F for the variable of Wall scrolling speed test was 12.86, which is a statistically significant value at the level of significance (0.05), where the tabulated value (f) = 4.02. The width of the shoulders is the only physical measurement that contributes to this test, with a contribution rate of 18.2%. Thus, the regression line equation can be formulated as follows: Wall Scrolling Speed Test = (-0.144 x shoulder width) + (14.881).

The value of (f) calculated for the test variable of Running speed with the ball (dribbling) reached 11.27, which is a statistically significant value at the level of significance (0.05), the value of (f) tabulated being 4.02. Weight is the only physical measurement that contributes to this test, with a contribution rate of 16.3%. The regression line equation can be formulated as follows:
Test of running speed with the ball (dribbling) = (0.054 x weight) + 6.006.

It also appears from the above table that the physical measurements that contributed to the vertical jump test are leg length and the circumference of the calf, where the value of (f) calculated for these measurements reached 5.014, which is a statistically significant value when compared with the tabulated value of 3.17. we can formulate the regression line equation as follows:
Vertical jump test = (0.178 x leg length) - (0.238 x calf circumference) + 40.305.

The data indicate that the most important physical measurements that contribute to the vertical jump test are the leg length, and the calf circumference.

The researchers attribute this to the fact that a man's height means a higher centre of gravity, and this is a positive feature for the basketball player, as it helps him to quickly reach the basket and score. The circumference of the calf helps the player jump up and forward through the function of the muscle groups in the lower limb area of the body, and this in turn helps the player to control the rebounding balls in defence and attack situations. This is consistent with Rodriguez-Rosell et al. (2017).

To answer the second question, the researcher used the Pearson correlation coefficient.

Table 3. *Correlation between selected anthropometric measurements and players' performance scores in physical skill performance test*

Skill and physical tests Anthropometric measurements	Running with the ball at speed (dribbling)	Wall Scrolling Speed	Free throw line shooting	Shooting from the side	Forward shooting	Vertical jump
weight	0.40 **	-0.38 **	0.27 *	0.09	- 0.08	0.21
total body length	0.18	- 0.23	- 0.06	- 0.05	0.07	0.01
upper end length	0.07	-0.30 *	-0.02	-0.12	0.04	0.10
lower end length	0.19	-0.24	0.001	-0.05	0.03	0.02

arm length	0.09	-0.30 *	-0.002	-0.16	-0.001	0.02
leg length	0.06	-0.11	0.30 *	0.08	0.05	0.29 *
chest circumference	0.33 **	-0.39 **	0.33 **	0.09	-0.05	0.20
upper Arm	0.04	0.04	0.01	0.25 *	0.30 *	0.01
calf circumference	0.34 **	-0.36 **	0.23	0.03	- 0.09	0.25 *
shoulders width	0.30 **	0.42 **	0.30 *	0.03	- 0.16	0.17

*Note: * Statistically significant where the tabulated value (t) is at the level (α ≤ 0.05) = 0.2500*
*** Statistically significant where the tabulated value of (t) is at the level (α ≤ 0.01) = 0.3248*

Table 3 shows the values of the Pearson correlation coefficient between physical measurements and skilful physical performance tests, and by noting the values contained in the table, we find that the highest correlation has reached the value 0.42 between shoulder width and the wall scrolling speed, which is a significant correlation, followed by the correlation of weight with the skill of running with the ball, which reached the value 0.40, while the correlation between the length of the arm and forward shooting was the lowest correlation value, reaching -0.001, as well as the correlation coefficient between the length of the lower end and the shooting from the free-throw line (where its value reached 0.001).

Table 4. *Anthropometric measurements contribute to physical skill tests*

Vertical jump test	Running speed with the ball (dribbling)	Wall Scrolling Speed Test	Free throw line shooting test	Shooting from the side test	Forward shooting test	Skilful physical performance tests
Leg length Calf circumference	Weight	Shoulder width	Chest circumference Leg length Shoulders width	Upper arm circumference	Upper arm circumference	Contributing anthropometric measurements

It is evident from Table 4 that the circumference of the upper arm contributed to the tests of forward shooting and shooting from the side, and that the leg length contributed to the tests of shooting from the free-throw line and the vertical jump.

Discussion

It is clear from the presentation of the data in Table 2 that the most important physical measurements contributing to the tests of forward shooting and shooting from the side is the circumference of the upper arm. Researchers attribute this to the fact that the upper arm plays a key role in the process of shooting at the basket, because this skill needs strength in the arm muscles, especially in the upper arm area. This agrees with Hopkins et al. (2009) who stated that the increase in circumference for the upper and lower ends is due to the large and dense muscle groups that work on these parts of the body, as they effectively assist in the motor performance of offensive skills. It was also indicated that the outstanding female basketball players are distinguished by several measurements, including the upper arm circumference.

As evident from the data, upper arm circumference makes a notable contribution to predicting proficiency in forward shooting and side shooting, both fundamental skills for basketball players. It is clear from the same table that the most important physical measurements that contribute to the test of shooting the free-throw line are the chest circumference, leg length, and shoulder width. This can be attributed to the role these measurements play in the shooting process, as the muscles in these areas of the body contribute significantly to various shooting techniques. This is consistent with Gil et al. (2018) and Hoffman et al. (1996) who emphasize the importance of rib cage circumference, particularly the muscle group around the chest, in controlling motor performance, especially in skills such as bouncing the ball and shooting for long distances, which are vital aspects of modern basketball gameplay.

Regarding the test of wall scrolling speed, it was found that the most significant physical measurement contributing to this skill is shoulder width. The researchers attribute this to the increase in shoulder width leading to greater muscle density in this area, subsequently enhancing the strength of the thoracic belt region. This particular skill requires exceptional strength and speed, involving frequent and rapid passes in a limited timeframe, which aligns with the demands of modern basketball gameplay, characterized by continuous and rapid player and ball movement. This observation is in line with Man (2017), who highlights that basketball players stand out from athletes in other sports in terms of shoulder width measurements. For the running speed test with the ball, weight emerged as the most important physical measurement. The researchers attribute this finding to the relative weights of players in this age group, which are proportionate to their overall height. Unlike adult categories, where larger relative weights are more common, younger players tend to have more consistent weight-to-height ratios. This is supported by Rodriguez-Rosell et al. (2017), who emphasize the importance of measuring weight in relation to continuous dribbling skills in multiple directions, as seen in sports like handball.

The analysis of data revealed that the most crucial physical measurements contributing to the vertical jump test are leg height and calf circumference. This can be attributed to the significance of leg length, as it determines the height of the body's centre of gravity. This is advantageous for basketball players, enabling them to quickly reach the basket and score points. Additionally, calf circumference plays a vital role in helping players jump upward and forward, thanks to the muscle groups in the lower part of the body. This capability aids players in controlling rebounded balls in both defensive and offensive situations. These findings are in accordance with the study by Köklü et al. (2011), which emphasizes that leg and arm muscle strength are crucial physical attributes that contribute to defensive follow-up skills in basketball.

The data presented in Table 4 clearly demonstrates statistically significant correlations between forward and side shooting tests and the measurement of upper arm circumference. This relationship can be attributed to the increase in upper arm circumference, which reflects an increase in muscle cross-sectional area. This, in turn, enhances muscular strength, a crucial requirement in basketball, especially during the shooting process. These findings align with Gilet al. (2018) and Tredrea et al. (2017), highlighting that muscle circumference measurements for various body parts provide insights into the muscle's cross-sectional size, indicating its capacity to exert force. Willer et al. (2012) also support this, emphasizing that increased circumferences in the upper and lower body parts result from large and dense muscle groups, which significantly contribute to the motor performance of offensive skills in basketball.

Table 4 also reveals correlations between the free-throw shooting test and each of the following measurements: weight, leg length, chest circumference, and shoulder width. An increase in weight, which often signifies increased muscle size, reflects greater body circumferences and the necessary muscular strength for basketball.

Leg length serves as a positive indicator for basketball players. As noted by Willer et al. (2012), basketball players typically have longer bodies and limbs. Players need to bend their knees when shooting free throws, and this requires the appropriate technical technique for this skill. The correlation between free-throw shooting and chest circumference and shoulder width can be attributed to the role of upper body measurements in enhancing motor skills in basketball, as emphasized by Woods et al. (2017). The pectoral girdle muscle group plays a crucial role in controlling the motor performance of game skills, including dribbling, and shooting from a distance.

The data presented in Table 4 clearly reveal statistically significant correlations between the wall scrolling speed test and various measurements: weight, upper end length, arm length, chest circumference, calf circumference, and shoulder width. Additionally, there are statistically significant correlations between the dribbling (running with the ball) test and these measurements: weight, chest circumference, calf circumference, and shoulder width.

The increase in weight corresponds to an increase in certain body circumferences, thereby enhancing the muscular strength required for basketball, as highlighted by previous studies (Gil et al., 2018; Woods et al., 2017). This is consistent with the findings of Tredrea et al. (2017), who underscore the significance of weight as a crucial physical measurement in the skill of continuous dribbling in multi-directional handball.

Furthermore, the researchers observed that chest circumference and shoulder width are advantageous for basketball players during ball dribbling, defensive and offensive coverage, and tracking operations. This finding aligns with Man's study (2017), which emphasizes the importance of chest circumference, particularly the pectoral girdle muscle group, in controlling motor skills, notably dribbling.

Calf circumference supports players in achieving quick sprints, whether with or without the ball. This is in agreement with Man's study (2017), which underscores the role of calf muscles in accelerating rapidly from a stationary position.

Significant correlations between the vertical jump test and specific measurements, namely leg length and calf circumference, are evident. The researchers attribute the importance of leg length to the player's centre of gravity. A greater leg length implies a higher starting point when jumping, allowing the player to reach the basket faster. This insight aligns with Cui et al.'s findings (2019), which highlight how leg length, by elevating the centre of gravity, increases the duration of the player's stay in the air. This, in turn, enables the player to navigate the defence and execute a jump shot effectively, as observed in handball.

Additionally, the researchers explain that an increase in calf circumference reflects muscular strength and leads to a more powerful contraction, thereby enhancing the height of the jump. This notion is supported by the studies of Cui et al. (2019) and Gil et al. (2018), emphasizing the pivotal role of calf muscles in both forward and upward jumping. Woods et al. (2017) also indicate a correlation between leg circumference and the muscular capacity of soccer players' legs.

Although there are statistically significant correlations between physical measurements and skilful physical performance tests, they are insufficient for the required significance. The correlation coefficients are less than the average and low, so it is necessary to search for other predictive sources that contribute to the selection process.

Conclusions

By presenting and discussing the results and within the limits of the study sample and its fields, the researchers concluded the following:

- There are statistically significant correlations between the tests from forward shooting, the side, and the free-throw line with the physical (anthropometric) measurements.
- There are statistically significant correlations between wall scrolling speed tests, the ball running speed test (dribbling) and the measurements of weight, upper end body lengths, arm, chest and calf circumference, and shoulder width.

The most important anthropometric measurements contributing to the skill tests under study are those related to chest circumference, leg length, shoulder width, and weight.

The most important anthropometric measurements that have a predictive ability in the vertical jump test were the leg length and the calf circumference.

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Data Availability Statement: Data are available upon request to the contact author.

Conflicts of Interest: The authors declare no conflict of interest.

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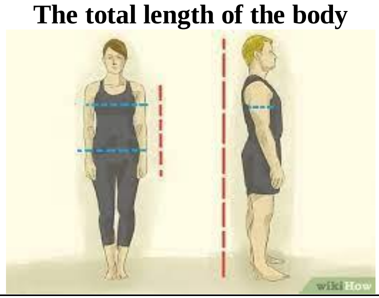
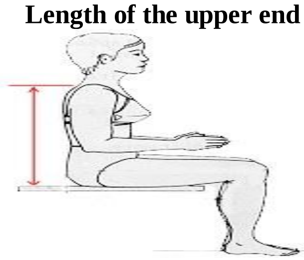
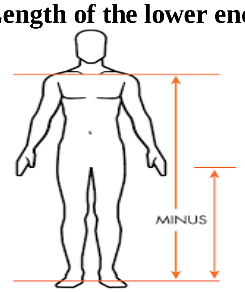
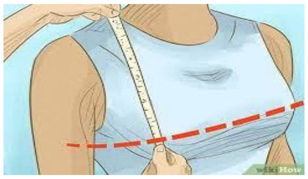
Appendix 1

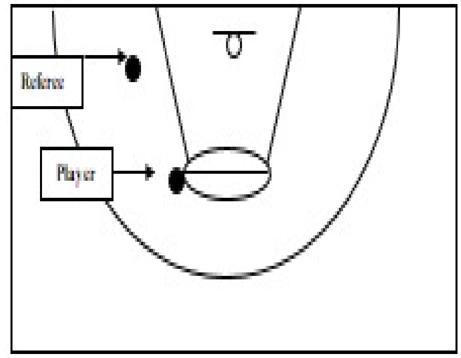
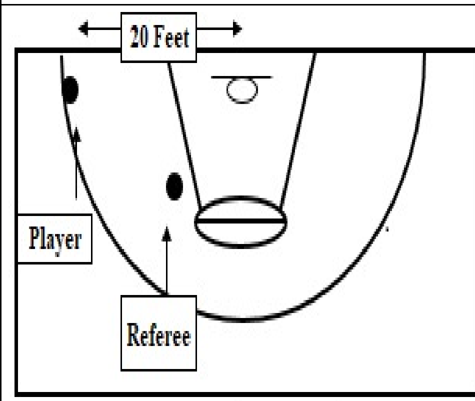
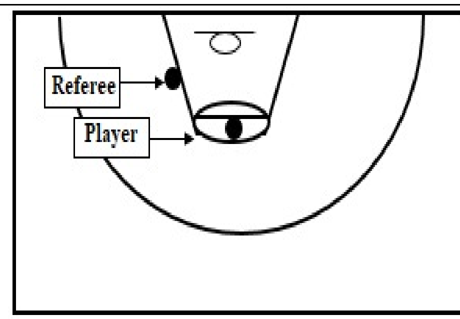
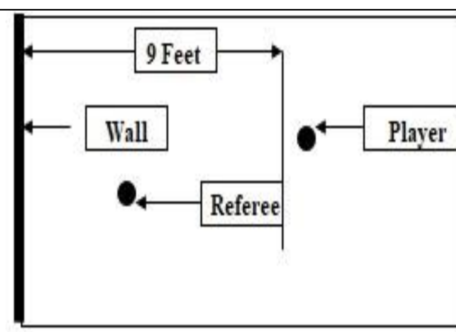
Methods for taking body measurements

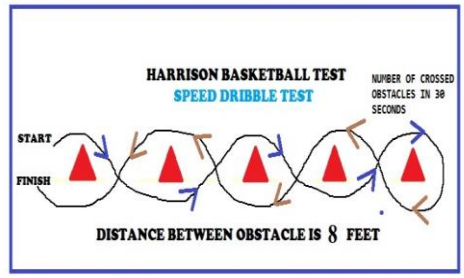
1- Weight and height	**A**	**Body Weight** 	When taking the weight, the tested individual must wear as little clothing as possible, preferably completely naked, except for light swimsuits or pants, and the tester must stand erect in the middle of a medical scale, and record the weight to the nearest ten kilogram
	B	**The total length of the body** 	The tested individual stands without shoes and the heels are close together and touching the wall, as well as the plates and the seat and looking forward and the head is perpendicular to the body, and the measurement is taken from the ground up to the highest point of the skull.
	C	**Length of the upper end** 	From a long sitting position on the floor with the back of the test subject touching the wall with the body pulled up and looking forward. Where the measurement is taken from the ground up to the highest point of the skull.
	D	**Arm length**	The length of the arm was measured using a tape measure to the nearest 0.5 cm, and the distance was calculated from the lateral tip of the other protrusion of the plate bone to the end of the middle finger while it was extended
	E	**Length of the lower end**  	Measured with a tape measure, the length is calculated from the greater trochanter of the upper head of the femur to the floor.
	F	**Leg length**	The length of the leg was measured using a tape measure, and the length was calculated from the pubic symphysis to the medial prominence of the tibia.

2- circumference	**A**	**Chest circumference** 	It was measured using the measuring tape, where the test individual raises the arms aside and then the tape is placed on his body so that it passes from the back under the lower angle of the two plates bones and from the front east of the nipples, then the tester lowers the arms down and the measurement is taken.
	B	**Circumference of the upper arm** 	The circumference of the upper arm was measured using a tape measure, where the tape was placed on the upper arm area and the maximum measurement was taken from the flexed position.
	C	**Circumference of calf** 	Calf circumference was measured using a tape measure, where the tape was placed on the leg area, and the maximum measurement was taken from the relaxed position.
3- width	**A**	**Shoulders width** 	The ends of the caliper shall be placed on the two lateral summits of the acromial process of the two plate bones, taking into account that the caliper shall be in a horizontal position parallel to the ground during the measurement.

Appendix 2

Skilful physical performance tests:

Forward shooting	**Performance Specifications:** The player shoots the ball at the basket from the specified place, and performs the shooting with one hand or with both hands. The laboratory has (15) attempts to be performed in three groups, five throws for each group, with a rest (1 min) between the three groups. **Register:** Two points are awarded for each successful shot entered into the basket. One point is awarded for each shot in which the ball touches the ring and does not enter the basket. Scores do not count when the ball does not touch the ring. The maximum score on the test is (30).	
Shooting at the basket from the side	**Performance Specifications:** The player shoots from the specified place at a distance of (20) feet (6 m) from the centre of the basket. The player performs (20) shots. Where he shoots (10) shots from each side. The player is given a rest period (1 min) between the two sets. **Register:** Two points are awarded for each successful shot entered into the basket. One point is awarded for each shot in which the ball touches the ring and does not enter the basket. Scores do not count when the ball does not touch the ring. The maximum score on the test is (40).	
Shooting from the free throw line	**Tool specifications:** Throws are performed from behind the free-throw line, and each player has (20) attempts, so that he performs them in (4) sets - (5) shots per set - and the player is given a rest period (30 sec) between sets. It is allowed to perform some throws before performing as an experiment. **Register:** One score is calculated for each correct hit (the ball enters the basket) made by the player, and no score is calculated in which the ball does not enter the basket. The maximum score on the test is (20) marks.	
Wall Scrolling Speed	**Performance Specifications:** The player stands behind a line drawn on the ground and at a distance of (9) feet (275 cm) from the wall. When he hears the start signal, the player passes the ball to the wall and receives it after it bounces off the wall to repeat until it leads (10) sound passes. Figure No. (13) shows that. **Register:** The time to perform the test is calculated from the moment the ball touches the wall in the first pass until the ball touches the wall in the tenth pass. The time is calculated in seconds, to the nearest (1/100) of a second.	

Running with the ball at speed (dribbling)	**Performance Specifications:** The player stands behind the start and with the ball, when he hears the start signal, he runs between the chairs back and forth as shown in the figure, until the player crosses the finish line. **Register:** Calculates the time taken by the player from the moment the start signal is given until he crosses the finish line, and records for the player the best time he scored in both attempts, to the nearest (1/10) of a second.	
Vertical jump	**Performance Specifications:** The player stands by the wall with a piece of chalk in his hand, knees straight and feet flat on the ground. From this position, the player raises the arm holding the chalk and makes a mark on the wall at the point where his fingers can reach. Then he swings his arms with his knees bent, then jumps up, marking the wall with chalk. The distance between the two marks is measured with a tape measure, which expresses the distance of the jump up. **Register:** The distance between the two marks reflects the player's ability to jump vertically, and the measuring tape must be perpendicular to the ground when taking the measurement. The best of the two attempts is recorded.