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## ORIGINAL ARTICLES. SPORT

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# Forecast the accuracy of spike and blocking skills in terms of some physical measurements and physical and motor abilities of volleyball players

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Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

DOI: <https://doi.org/10.34142/HSR.2022.08.02.05>

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### How to Cite

Nawazad Hussien Darwesh, Nihad Ayoub Qadir, Twana Wahbi Ghafoor Sharif. Forecast the accuracy of spike and blocking skills in terms of some physical measurements and physical and motor abilities of volleyball players. *Health, Sport, Rehabilitation*. 2022;8(2):53-62. <https://doi.org/10.34142/HSR.2022.08.02.05>

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### Abstract

**Purpose:** to find an equation for accurately predicting the skills of spike skill beating (straight and diagonal), and the blocking skills about specific physical measures physical and kinetic skills of volleyball players. The skill of spike and skill blocking is one of the basic skills in volleyball, whose performance requires high compatibility and balance between physical measurements and physical skills

**Material and Methods.** Moreover, monitoring shows that no statistical equation predicts the punch and squeezes talents that hinder the volleyball sector for the age group (14-16). In the youth volleyballers centers in Erbil, the number of players was (75) out of (106) participants (76% of the total population). 25 Players were excluded because they did not complete the test requirements.

**Results.** The manuscript reached the following results: It was possible to identify the values of some physical measurements and physical and motor abilities affecting the level of accuracy test performance of the skill of spike (straight and diagonal). And through the logical analysis of the regression of anthropometric indicators and physical and motor abilities. The regression equation for the first indicator was:  $\hat{Y} = a + b x$ . The second indicator is:  $\hat{Y} = a + b_1 x_1 + b_2 x_2$ . As for that, the compatibility index is the most contributing variable to the accuracy of the performance of the blocking skill, as its contribution rate was for the first indicator:  $\hat{Y} = a + b x$ . And the second indicator:  $\hat{Y} = a + b_1 x_1 + b_2 x_2$

**Conclusions:** were a statistically significant correlation between some physical measurements, physical and motor abilities, and the accuracy of the spike skill and the blocking skill (Straight and diagonal) of the research sample. Regression equations were obtained to predict the accuracy of the hit performance (Straight and diagonal) in terms of physical measurements, physical abilities, and kinetics.

**Keywords:** spike and block, measurements, accuracy, volleyball, predict

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### Анотація

Навазад Хуссієн Дарвеш, Ніхад Аюб Кадір, Твана Вахбі Гафур Шаріф. Прогнозування точності виконання нападаючих ударів і блоків за деякими фізичними показниками та фізико-руховими можливостями волейболістів.

**Мета.** Це дослідження має на меті знайти рівняння для точного прогнозування навичок нападаючих ударів (прямі та діагональні), а також навичок блокування щодо конкретних фізичних показників фізичних та кінетичних навичок волейболістів. Навичка виконання нападаючих ударів і блокування є одним з основних навичок у волейболі, виконання якого вимагає високої сумісності та балансу між фізичними вимірами та фізичними навичками.

**Матеріал і методи.** Більше того, моніторинг показує, що жодне статистичне рівняння не прогнозує ударів і витискає таланти, які заважають у волейбольному секторі для вікової групи (14-16). У центрах молодіжних волейболістів Ербіля кількість гравців становила (75) з (106) учасників (76% від загальної кількості населення). 25 гравців було виключено, оскільки вони не виконали вимоги тесту.

**Результати.** Вдалось виявити значення деяких фізичних вимірів і фізичних і рухових здібностей, що впливають на рівень виконання тесту точності навичку нападаючих ударів (прямий і діагональний). А через логічний аналіз відбувається регресія антропометричних показників і фізичних і рухових здібностей. Рівняння регресії для першого показника було таким:  $\hat{Y} = a + b x$ . Другий показник:  $\hat{Y} = a + b_1 x_1 + b_2 x_2$ . Що стосується цього, то індекс сумісності є найбільшою змінною, яка сприяє точності виконання навичку блокування, оскільки його коефіцієнт внеску був для першого показника:  $\hat{Y} = a + b x$ . І другий показник:  $\hat{Y} = a + b_1 x_1 + b_2 x_2$ .

**Висновки:** була статистично значуща кореляція між деякими фізичними вимірами, фізичними та руховими здібностями, а також точністю навичок нападаючих ударів і навичок блокування (прямий і діагональний) досліджуваної вибірки. Рівняння регресії були отримані для прогнозування точності виконання удару (прямий і діагональний) з точки зору фізичних вимірювань, фізичних здібностей та кінетики.

**Ключові слова:** нападаючий удар і блок, вимірювання, точність, волейбол, прогноз

### Аннотация

Навазад Хуссейн Дарвеш, Ніхад Аюб Кадир, Твана Вахбі Гафур Шариф. Прогнозирование точности выполнения нападающих ударов и блоков по некоторым физическим показателям и физико-двигательным возможностям волейболистов.

**Цель.** Это исследование направлено на поиск уравнения для точного прогнозирования навыков выполнения нападающих ударов (прямых и диагональных) и навыков блокирования конкретных физических показателей физических и кинетических навыков волейболистов. Навык выполнения нападающего удара и навык блокировки - один из базовых навыков в волейболе, выполнение которого требует высокой совместимости и баланса между физическими размерами и физическими навыками.

**Материал и методы.** Более того, мониторинг показывает, что ни одно статистическое уравнение не прогнозирует ударов и вытесняет таланты, которые мешают волейбольному сектору для возрастной группы (14-16). В молодежных волейбольных центрах в Эрбиле количество игроков составляло (75) из (106) участников (76% от общей численности населения). 25 игроков были исключены из-за того, что они не выполнили требования теста.

**Результаты.** Удалось выявить значения некоторых физических измерений и физико-двигательных способностей, влияющих на уровень точности выполнения теста навыка нападающего удара (прямого и диагонального). А через логический анализ регрессии антропометрических показателей и физических и двигательных способностей. Уравнение регрессии для первого индикатора было следующим:  $\hat{Y} = a + b x$ . Второй показатель:  $\hat{Y} = a + b_1 x_1 + b_2 x_2$ . Что касается этого, индекс совместимости является переменной, в наибольшей степени влияющей на точность выполнения блокирующего навыка, так как его коэффициент вклада был для первого индикатора:  $\hat{Y} = a + b x$ . И второй показатель:  $\hat{Y} = a + b_1 x_1 + b_2 x_2$ .

**Выводы:** выявлена статистически значимая корреляция между некоторыми физическими показателями, физическими и двигательными способностями и точностью навыка спайка и навыка блокировки (прямого и диагонального) исследуемой выборки. Были получены уравнения регрессии для прогнозирования точности выполнения ударов (прямых и диагональных) с точки зрения физических измерений, физических способностей и кинетики.

**Ключевые слова:** нападающий удар и блок, измерения, точность, волейбол, прогноз



## Introduction

Volleyball is one of the most successful and Villette most competitive games globally, characterized by excitement because of the abundance of motor skills and performance volleyball enjoys worldwide popularity, with only soccer attracting more global participation [1]. A volleyball player must have the physical measurements and physical and motor abilities appropriate to the game's requirements for the skillful performance of the players. (Morphological characteristics in human beings are affected by ecological, biological, geographical, racial, gender, and age factors [2]. This game has taken a large share of the increasing interest by increasing the number of world championships throughout the year.

This is what called on the International Federation of Volleyball to legislate several game rules to make it more exciting and exciting. Volleyball is one of the sports activities that reached a sophisticated level. As a result of the entry of the scientific side, all aspects, including these aspects (physical, body, and kinetics) of the players, for example, the length of the body, plays an essential role in the performance of the skill beating to the crushing and can be used by the team to penetrate and break the wall of the opponent's opponent and get points. Anthropometric measurements are essential in that they are often used as a basis for success or failure in a particular activity; this is confirmed by the studies of both Kohler and others [3, 4, 5].

However, this also requires consistency between other parts of the body and body mass. The rapid pace of this game requires both functional and physical adaptation to provide the energy needed to perform the performance of a high-precision skill. "The performance in sport depends on a pack of tactical, physical, skill and even psychological aspects, and anthropometric factors" [6, 7]. Reaching the jump is necessary for the spike and blocking. One of the most important aspects of volleyball is the increase in human, material, and technical aspects because of the spike, both for the men's and women's game, and the blocking, in men's game, are the most correlated actions with winning. [8, 9].

The physical measurements occupy a special place in the volleyball game; they offer the opportunity to study the relationship between skill performance and body specifications. As indicated (carter). "The morphological characteristics of an athlete play a significant role in the success of a high-level sports career. And therefore, they form a basic criterion for the chosen female volleyball athletes" [10]. There are many physical capabilities in volleyball, including vertical jump capabilities. Jumping a volleyball player requires fast and synchronized coordination of body movements. The body needs to overcome inertia (Newton's First Law), by having a force applied to the player (Newton's Second Law) by using power against the ground that provides an equal and opposite force back (Newton's Third Law) [11].

Therefore, the prediction is significant in the process of selection and selection of players through the use of scientific means, which in turn contributes to the selection of the best athletes. This, in turn, reflects positively on the training process in terms of shortening and reducing time. The accuracy requires full control of the muscles of the human will to be directed towards the specific target, and is the prediction of the branches of science, which is interested in the study of the future of what will happen in the future according to statistical methods (linear regression and multiple), and thus provides advance data will be reached. The importance of the research is to predict the accuracy of the performance of the spike skill (rectal and diagonal) and the wall of the shock in terms of some physical measurements and physical and motor abilities of the volleyball players to achieve good results in the future.

## Material and Methods

### Participants

In the youth volleyball centres in Erbil, the number of players was (75) out of (106) participants (70% of the total population). 25 Players were excluded because they did not complete the test requirements (Tabl. 1).

Table 1

Details of the research sample

Youth Community	Search community	Sample Final Experience
Youth Center- A	18	12
Youth Center- B	18	12
Youth Center- C	16	12
Youth Center- D	14	10
Youth Center- E	14	10

Youth Center- F	14	10
Youth Center- G	14	9
Total	106	75

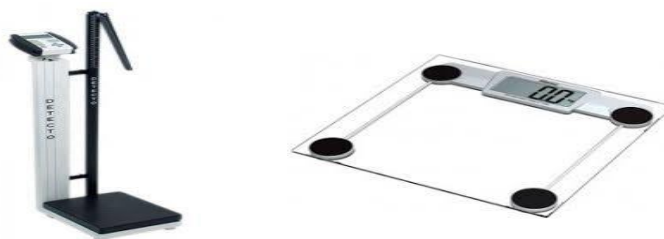


Fig. 1. Measuring device Length and body weight measuring device



Fig. 2. Jump Mat Device

### Equipment

Measuring tape length (20 m), medical Ball, (plastic cones) number (5), and platform electronic jumping device (type Axuo)

### Applied tests

#### Physical measurements

1 - Body length: Detecto was used to measure the size of the body, noting that the distance measured from the ground and the highest point in the skull head [12].

2. Body mass: Measurement is performed through the medical balance of the nearest half kilogram. The laboratory stands in the middle of the base of the balance so that the body's weight is distributed on the feet.

#### Physical and kinetic tests applied

- 1- Zigzag test running in a barrow manner [13].
2. Extend extension test [14].
- 3 - Test the explosive power of the two legs



Fig. 3. Test the accuracy of the performance of the spike skill (Straight and diagonal) and blocking

A particular device (jump mat) number (1) with dimensions (50 x 110 cm) was used to measure kinetic variables directly in the course of performance. Among these variables is a vertical jump in centimeters. The experiment was carried out on the jumping mat competence of the mechanics/volleyball.

### Technical tests used

- 1 - Test the accuracy of the spike Beating skill (Straight and diagonal)
- 2 - Test the accuracy of the blocking skill: [15].

### Tests conducting process

The tests were carried out in two days for each youth centre according to the scheduled schedule from 2/8/2021 until 21/10/2021. First, physical measurements (total body length, body mass) were carried out. Then, the second day was conducted to test the accuracy of the overwhelming beating in the directions (rectal and catheter) and the barrier wall.

### Statistical means

The researchers used the statistical SPSS version 18 for data processing.



## Results

Three variables are not significant in the correlation.

He points out (El-Meligy) Quoting (Paul J). that the relationship between two or more variables is usually studied in the hope of using the derived relationship in helping to estimate, guide, or predict the regression methods [16]. and that this problem of

linear prediction leads to the problem of straight-line alignment of a set of points. This equation can be written in the following picture:

$$\hat{Y} = a + b x$$

As a = constant amount

And b = regression coefficient

And x = the measurement value of the contributing variables.

Table 2

Computational circles, standard deviations, and torsion coefficients

NO	Variables	Arithmetic mean	standard deviation	Torsion coefficient
1	Body length	173.240	6.372	-0.230
2	Body mass	62.209	7.777	0.250
3	The explosive force of the two legs	41.68	7.046	-0.221
4	Trunk flexibility	30.0267	7.068	0.759
5	The power of speed	11.554	1.337	-0.416
6	Kinetic compatibility	13.280	2.339	0.367
7	Fitness	7.724	0.595	-0.566
8	The overwhelming beating (rectal and diagonal)	26.040	6.143	-0.084
8	Blocking	28.400	3.158	0.449

Table 3

Crosslink parameters for search variables

Research Variables and Probability Ratio	The value of the correlation with the accuracy of the spike skill (straight and diagonal)
Body length	0.476*
Sig. (2-tailed)	0.0001
Mass	0.195
Sig. (2-tailed)	0.047
The explosive force of the legs	0.442*
Sig. (2-tailed)	0.0001
Flexible trunk	-0.022
Sig. (2-tailed)	0.425
The power of speed	0.302**
Sig. (2-tailed)	0.004
Kinetic compatibility	-0.015*
Sig. (2-tailed)	0.450
Fitness	0.140
Sig. (2-tailed)	0.116

Therefore, the researcher performed the steps of the logical analysis of the regression of the physical, physical, and motor abilities, which achieved the highest correlation with the skill

performance accuracy test to determine the percentage of the contribution of these variables in the precision accuracy of the performance of the spike skill.



Table 4

Multivariate analysis of physical somatic, physical abilities, skill performance and contribution rates in the accuracy of the performance of the spike skill

No	Variables	Fixed Amount	Parameter	Calculate	Error Probability Ratio	The degree of freedom	Link value	Contribution Ratio
1	Body length	53.443	0.459	21.376	0.000	73	0.476	0.226
2	Body length of the explosive power of the legs	71.534	0.468 0.394	27.270	0.000	72	0.657	0.431

Table 4 shows that the variables of research and contribution to the accuracy of skill performance have reached three variables, respectively:

The first indicator

Table 4 shows that the body length index is the most contributing variable to the accuracy of the performance of the spiking skill, as its contribution rate reached (0.226). Thus, the equation of the predictive slope line with the accuracy of the skill of the overwhelming beating of the movement in terms of body height is:  $\hat{Y} = a + b x$

The second indicator

Table 4 shows that the index of the explosive power of the legs is the second contributor to the accuracy of the skill's performance of the crushing

strike. It raised the contribution ratio from (0.226) to (0.431) by (0.205) from the contribution of the first indicator.

Accordingly, the equation of the predictive slope line is:

$$\hat{Y} = a + b_1 x_1 + b_2 x_2$$

As  $b_1$  = the regression coefficient value of the first contributor.

And  $x_1$  = the measurement value of the first contributing indicator.

And  $b_2$  = the regression coefficient value of the second contributor.

And  $x_2$  = the measured value of the second contributor.

Table 5

Crosslink parameters for search variables

Research Variables	The accuracy skill of the barrier wall
Body length	-0.236*
Sig. (2-tailed)	0.021
Mass	-0.014
Sig. (2-tailed)	0.454
The explosive force of the legs	-0.126
Sig. (2-tailed)	0.141
Flexible trunk	-0.025
Sig. (2-tailed)	0.415
The power of speed	0.049
Sig. (2-tailed)	0.338
Kinetic compatibility	0.264*
Sig. (2-tailed)	0.011
Fitness	-0.064
Sig. (2-tailed)	0.292

Three variables are not significant in the correlation.

The relationship between two or more variables is usually studied in the hope of using the derived relationship in helping to estimate, guide or predict the regression methods. This problem of linear

prediction leads to the problem of the straight-line alignment of a set of points. This equation can be written in the following picture:

$$\hat{Y} = a + b x$$

As  $a$  = constant amount

And  $b$  = regression coefficient



And  $x$  = the measurement value of the contributing variables.

Accordingly, the researcher performed the logical analysis of the regression of the physical bases and physical and motor abilities, which achieved the

highest correlation with the test accuracy of the skill performance to determine the contribution of these variables in the blocking.

Table 6

Multiple regression analysis of physical bases, physical and motor abilities, skill performance, and contribution rates in wall barrier performance accuracy

No	Variables	Fixed Amount	Parameter	Calculated	Error Probability Ratio	The degree of freedom	Link value	Contribution Ratio
1	Kinetic compatibility	23.660	0.357	5.489	0.022	73	0.264	0.070
2	Kinetic compatibility Body length	43.244	0.345 0.112-	4.959	0.010	72	0.348	0.121

Table 6 shows that the compatibility index is the most contributing variable to the accuracy of the performance of the blocking skill, as its contribution rate was (0.070).

The first indicator

Accordingly, the equation of the regression line predictive of the accuracy of the performance of the block skill of movement in terms of body length is:

$$\hat{Y} = a + b x$$

The second indicator

Table 6 shows that the body length index is the second contributor to the accuracy of the performance of the blocking skills, as it raised the contribution percentage from (0.070) to (0.121) by (0.051) from the contribution of the first indicator.

Accordingly, the predictive slope equation is:

$$\hat{Y} = a + b_1 x_1 + b_2 x_2$$

$B_1$  = the regression coefficient value of the first contributor index.

And  $x_1$  = the index value of the first shareholder.

And  $b_2$  = the regression coefficient value of the second contributor index.

And  $x_2$  = the measured value of the second contributor.

## Discussion

When watching table 4. The researcher attributed this result to the fact that the length of great importance in volleyball reduces the distance between the player and the height of the network. It contributes significantly to the performance of the spiking skill

because the length of the body has an essential role in achieving the results, size and its relation to the accuracy of the performance of the spike skill. As a result, accuracy is dependent on the individual's ability to estimate the distance and coordination between the movements of the body parts when working together at a very high speed, so it is necessary for a player to fully understand the distance from which the power is sent to them with this distance in the case of skill performance. In addition, the importance of precision in sporting events on which the Hit a target. Moreover, the point is recorded. As for the second indicator, the explosive force of the two legs is to remove the maximum force as soon as possible, as [17] defined it as "the maximum muscle strain that can be achieved in one muscle contraction." As he climbs up to raise his body over the upper edge of the net to overcome the rebound wall and properly complete the crushing bat, the volleyball player needs this aspect." While hitting the ball, the player must utilize his complete body to provide strength to his arms, extend the knee, and raise the hip." [18].

When watching table 6, the attributes this result to the fact that height is of great importance in volleyball, which reduces the distance between the player and the height of the network. It contributes to reaching the network quickly to perform the skill of the wall of the resistance. Size is significant in many sports, as it is the total length or length of the arms and legs. And the consistency of the length of the limbs with each other is essential in acquiring the individual muscle and nervous in most sports activities. Motor coordination is the complex set of



interactions between neural processes involved in moving a limb and the actual stem in movement [19]. Hence, the compatibility between the eye, the hand, the eye, and the man are one of the most important factors for the performance of the skill of the wall of resistance, because through the performance movements there is a transmission of nerve signals from the nervous system to the muscular, so the more coordination between the physical and the technical skills is increased, which in turn helps to increase the compatibility between the performance and the goal, which is accuracy. Accuracy is defined as the ability to speed learning and master motor skills by directing the player's voluntary movements towards a specific purpose [20]. In volleyball, physical abilities are not necessary if they lack the motor precision in performing the performance of skills and directing the movements to the opponent's court, as well as have great importance in resolving the points if the player is good, especially during the performance of the blocking skill. As for the second indicator, Height The body is different from other elements of force. It requires the output of maximum strength as low as possible and requires the player to this element in the jump to the top to overcome the overwhelming beating of the opposing team. Therefore, the level of performance of the crushing defeat and the wall of resistance depends on the availability of the explosive power of the muscles of the two legs [21].

Based on the previous review of tables (2), (3), (4), (5), (6) and based on the results obtained from them, the researcher has reached some physical measurements and physical and motor abilities affecting the accuracy of the spike skill The correlation between these indicators and the percentage of their contribution to the accuracy of the spike skill and the resistor wall were also determined, as well as the determination of the predictive regression equations in terms of the values of the physical measurements and the physical and motor abilities. All the hypotheses in question have been answered.

## Conclusions

1. It is possible to identify some physical measurements and physical and motor abilities affecting the level of accuracy of the performance of the skill spike and blocking in the sample research. Furthermore, there is a statistical correlation between some physical measurements and physical and motor abilities and the accuracy of the skill spike and blocking performance in the research sample. Through the logical analysis of the regression of the indicator physical measurements and physical and motor abilities, it was possible to determine the variables of physical measures. Physical skills of the performance skill contribute to improving the accuracy of the skill of skill spike and blocking are as follows: (Body length, and the explosive power of the legs).

2. Equations of the regression line to predict the accuracy of the performance of the skill spike and blocking in the research sample. In terms of some physical measurements and physical abilities, and kinetics. As there through the logical analysis of the regression of the indicator's physical measures and physical and motor abilities, it was possible to determine the variables of physical measurements and the physical and motor abilities of the performance skill contribute to improving the accuracy of the performance of the wall, respectively: (Kinetic compatibility and Body length).

3. Equations of the regression line to predict the accuracy of the blocking skill's performance in the search are a function of some physical measurements and physical and motor abilities.

## Acknowledgements

The authors wish to thank all players for their participation in this study and the management of all youth centers, and we thank Faculty of Physical Education and Sports Science for their support in this study.

## Conflict of interest

The authors declare that there is no conflict of interest.

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Received: 2022-04-25    Accepted: 2022-05-26    Published: 2022-06-25