FINDING A PREDICTIVE VALUE FOR THE ACCURACY OF SPIKING SKILL FROM JUMPING IN TERMS OF SOME VARIABLES OF STRENGTH AND ANGULAR VELOCITY FOR YOUNG VOLLEYBALL PLAYERS

Dr. Abdullah Hameed Saleh Al-thubaini

The General Directorate of Education/Al-Anbar/ Iraq

Email: 1234zwwxm@gmail.com

ABSTRACT

The research included the introduction to the research and its importance, and the volleyball game was addressed from the distinctive games, rapid and difficult technical performance, and the overwhelming skill, which depends on a high level of strength and speed. If the main key in achieving the skill goal is the main key in achieving victory, Which made the interest in understanding the stages of performance for the skill of spiking and finding a predictive value to be of great importance since this stage affects the accuracy of the spiking hitting. As for the research problem, identifying the velocity variables that accompany the implementation of the skill of spiking and predicting the level of development based on the proportion of the contribution (Right Knee Force) variables, (Left Knee Force), Left Shoulder Force, and Right Shoulder Force. And ((Left Elbow Angular Velocity and Right Elbow Angular Velocity) and the research aims to find predictive equations for the level of development in terms of regression for the values of the variables. The research sample represents players of the volleyball industry club and used the Biosyn System. No extraction of the results and the researcher concluded the variable shares (Right Knee Force), With the highest percentage contribution with spiking accuracy from the upper and lower left sides.

Keywords: Predictive, accuracy, spiking, strength and angular velocity.

I. INTRODUCTION

The process of using accurate scientific analysis in sports training is imperative to reach the high level, and of course, it is the result of concerted scientific efforts that relied on field studies to solve everything that hinders the progress of sports, and the use of advanced technology in the study of sports movements and accurate scientific diagnosis in performance and the discovery of errors and treatment and the resulting Research works to help coaches to identify the degree of employing training variables to evaluate performance, develop achievement and raise it to the highest levels. Scientific analysis has been used to develop scientific solutions to the problems that volleyball players suffer from by studying the forces that affect the performance of players.

Most of the global teams took a share in this development by adopting a scientific mechanism for selecting and selecting players by coaches and putting them in training programs from evaluating performance and predicting the level of performance development for the skill of spiking hitting through preparing special training programs and using kinematic analysis through quantitative analysis that depends on finding The variables affecting the performance of the skill of spoiling, which requires us to use technical tools and devices, and with this, we can identify the most important main variables of the skill performance of spoiling hitting down to the minutes of matters. It promises (Right Knee Force), (Left Knee Force), Left Shoulder Force, and (Right Shoulder Force). And (((Left Elbow Angular Velocity) and Elbow Angular Velocity (Right)) one of the most important variables that have an effective and influential role in achieving the maximum speed of the skill of spiking and thus achieving success in the performance of the skill through the correct implementation of the technical stages of this skill, which require the application of special conditions of performance due to their connection In the subsequent technical stages, the smashing skill is one of the most prominent skills of the players, as it is one of the most important skills in the game of volleyball that the accuracy of its performance contributes significantly to determining the outcome of the match. Therefore, the researcher worked on studying this topic by research and analysis by knowing the special strength variables of the knee and shoulder joint, the angular velocity of the elbows according to the Biosyn...
System, which is one of the options that lead us to obtain accurate outputs in everything related to the characteristics of the motor path, the skill of spiking by jumping and improving the performance. Hence the importance of the research in opening new scientific horizons to help coaches develop special exercises for the players to reach the performance of the skill of hitting spiking by jumping according to the findings of the research in terms of the characteristics of the special strength variables of the knee and shoulder joint, the angular velocity of the elbows and its relationship to the accuracy of the spiking strike.¹

Which must be compatible with the players’ abilities and invest their physical capabilities to enhance the skilful abilities to reach the best levels, if the technical performance is the key to achieving the distinguished technical level of the volleyball player and this prompted the researcher to work to find these values, as the understanding of the stages of the performance of the hit The overwhelming effect of jumping is of great importance and one of the most used skills and influencing the results, in volleyball, as knowing the percentage of the variables contribution will contribute to organizing and directing training operations and giving indicative points for coaches to design training programs to perform the skill by revealing weaknesses and strengths and giving the necessary treatment and forecasting The player can achieve it in the future from moves with a high degree of difficulty in a relatively short period and according to the research indicators.

II. RESEARCH PROBLEM

Through the researcher's practice as a former player and teacher and his experience in that game as a witness to the performance of the players and her review of many sources and studies on volleyball, the researcher noticed the skill of hitting the spiking jump based on multiple foundations, the most important of which is everything related to the performance variables of the body movements by the player from the moment of preparation to the moment The beating, which prompted the researcher to study this problem by identifying the most important variables of special strength of the knee and shoulder joint, the angular velocity of the elbows according to the (Biosyn System) and its relationship to the accuracy of the spiking hit of players in volleyball club players to determine the relationship between the characteristics of the special strength variables of the knee joint The shoulder is the angular velocity of the elbows and the spiking accuracy by jumping high.

Research objectives

Identify the predictive values of the percentage of the contribution of the special force variables of the knee and shoulder joint, the angular velocity of the elbows, with the accuracy of the spike in volleyball players.

Identify the effect of each variable of the special strength variables of the knee and shoulder joint, the angular velocity of the elbows, with precision spiking in volleyball players.

Research areas

• The human field: (5) players representing the Industry Club.

• Spatial domain: Industry Club, Baghdad.


Research Methodology

The researcher relied on the descriptive approach in the method of correlational relations, which is "the accurate perception of mutual relations, so that the research gives a picture of reality, develops indicators and builds future predictions"², intending to reach scientific facts based on objective and correct foundations for its suitability to the nature and objectives of the research.
The research sample

The sample is defined as “the part that represents the community of origin, or it is considered the model on which the researcher performs the entirety of the focus of his work”\(^3\). The research sample was represented by the players of the Industry Club and the selection of (5) players by the deliberate method as they represent the community of origin. Searching for (age, weight, height, training age) as these were adjusted by using the torsion parameter.

Table 1. Shows the homogeneity of the research sample

<table>
<thead>
<tr>
<th>Variables</th>
<th>Units</th>
<th>Mean</th>
<th>Median</th>
<th>Std. deviation</th>
<th>Skewness</th>
<th>distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Year</td>
<td>20.60</td>
<td>21</td>
<td>0.547</td>
<td>-0.609</td>
<td>moderate</td>
</tr>
<tr>
<td>Weight</td>
<td>Kg.</td>
<td>68.800</td>
<td>68</td>
<td>1.643</td>
<td>0.518</td>
<td>moderate</td>
</tr>
<tr>
<td>Length</td>
<td>Cm</td>
<td>190.20</td>
<td>190</td>
<td>3.346</td>
<td>-0.088</td>
<td>moderate</td>
</tr>
</tbody>
</table>

It is evident from Table No. (1) that the values of the torsion modulus of the above measurements are limited to \((\pm 3)\), indicating that the sample was distributed normally. Whenever these values are close to zero or zero, this indicates that the distribution is moderate or close to it, and thus the sample is homogeneous according to the results of the skew coefficient. \(^4\)

Devices, tools and methods used in the research

1. Arab and foreign sources.
2. World Wide Web Resources (Internet).
3. Personal interviews.
4. Observation and analysis.
5. A rapid analysis camera, (2) type (Casio-ZR 1500) with a frequency of (1000) images/second.
6. Tripod (1) with a movable (Sharia) stand.
7. Biosyn system.
8. A computer.
9. Scale (1) meter.
10. A tape measure.

III. PILOT STUDY:

To pay attention to the accuracy and correctness of the study's performance and to avoid the difficulties that may arise during the field experiment procedures, the researcher conducted an exploratory experiment on a sample (3) of the players outside the research sample. With a quick video imaging mechanism, provided by the system, it measures the parameters of the special strength of the knee and shoulder joint, the angular velocity of the elbows, and attaches the sensors to the player's body with rubber belts, and after fixing the sensors on the player's body, and to photograph the movements by two quick Casio cameras, the speed One of them is up to (100) images / second, where the distances, dimensions and heights of the appropriate analysis cameras have been fixed so that the cameras sites cover all aspects of the artistic movement of the skill performed.

Spiking test \(^5\)

- The purpose of the test: Measure the accuracy of the high diagonal spiking skill.
- Hardware and tools: A volleyball court, ten volleyballs, adhesive tape, two mattresses, one of which is placed in the corner of the playing field so that two interior corners are at a distance of (5) cm from the side and end lines.
- Performance specifications: After the trainer performs the preparation from the centre (3) and directs the ball to the centre (4) in which the laboratory is located, and after the ball arrives, the laboratory performs the skill of spiking six times legally and correctly so that the tester performs (3) attempts on the back position, then (3) Other attempts at the front mattress
- The conditions: To perform the spiking hitting each time, you must meet the legal conditions for the skill and If the coach or the preparer makes a mistake in preparing the spike, the attempt will be repeated.
• Registration method:
  • (4) points are awarded for every correct spike in which the ball falls on the rank.
  • (3) points are awarded for each correct spike in which the ball falls into the planned area.
  • Two points are awarded for each valid spike in which the ball falls in (A) (B).
  • One point is given for each valid spike in which the ball falls in Zone C.
  • Zero is given for every spike in which the ball falls off the field or bounces off the net.

Field experiment
After the data obtained by the researcher from the reconnaissance experiment, it distributed the work team and installed the sensors of the system (Biosyn system) and places where the camera was placed. General and private warm-up Each player was given three attempts that were approved. The number of attempts approved for statistical analysis became (30) attempt.

Biosyn Systems
To evaluate the biomechanical indicators of the three-dimensional mathematical motions analysis system, the Biosyn system, the sensors contain a system of integrating the velocity and the action of gravity, and it allows to detect the angular displacement of the body's biomechanical action and displays according to the kinematic and kinematic data in its real position with multiple virtual images of the body movement and give three selected schematic models. The dimensions dispense with the scale drawing by fixing the anthropometric information of the parts of the body, and the system depends on the transmission speed of the signal between the sensor and the program, which is estimated at (100 information per second), to calculate the time and can be synchronized with a fast video imaging mechanism (100 images per second), and the system is formed. From the kinematic analysis program, the sensors (17), the serve and receiver of the signal, the central sensor for the measurements provided by the system, it measures the angles of the parts of the body and not the joints, the angular velocity, the angular velocity, the force generated on each joint, the force torque, the power, the pressure under the feet. Data collection is at a rate of (100) Hz and the transmission range is at a rate of (20 m) in any direction of the system's work.

After installing the sensors on the player's body, the device captures the player's image, as well as the data requested by the device such as age, weight, height, forearm length, leg length, thigh length, arm length, upper arm length, and you, must choose a symbol for each player to save the player's data. The device stores it on a large capacity (SD) card that allows recording for several hours in the field, and when the player performs the required movements, the sensors transfer the data to the device and exit easily through the (Excel) page for statistical processing on it. And the 3D mathematical movements analysis system, the sensors contain The system of integrating velocity and the action of gravity and allows to detect the angular displacement of the body's conduct biomechanically and display according to the kinematic and kinematic data in its real position with multiple virtual images of the movement of the body and give the selected three-dimensional schematic models. The system depends on the speed of signal transmission between the sensor and the program, which is estimated at (100 information per second), to calculate the time, and it can synchronize with a fast video camera (100 pictures per second). The system consists of a motion analysis program, the sensors, their number (17), a serve and a receiver. Indication, the central sensor for the measurements provided by the system is the measurements of the angles of the parts of the body, not the joints.

• Angular velocity unit of measure (Degrees / Sec.).
IV. RESULTS AND DISCUSSIONS

Table 2. Shows descriptive statistics for variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Units</th>
<th>Mean</th>
<th>Std. deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serve accuracy</td>
<td>Grade</td>
<td>3.034</td>
<td>0.905</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Left Knee Force</td>
<td>(N)</td>
<td>607.6</td>
<td>115.85</td>
<td>196.06</td>
<td>780</td>
</tr>
<tr>
<td>Right Knee Force (N)</td>
<td>(N)</td>
<td>426.94</td>
<td>112.65</td>
<td>212</td>
<td>660.39</td>
</tr>
<tr>
<td>Left Shoulder Force (N)</td>
<td>(N)</td>
<td>213.63</td>
<td>56.901</td>
<td>88.11</td>
<td>289</td>
</tr>
<tr>
<td>Right Shoulder Force (N)</td>
<td>(N)</td>
<td>297.76</td>
<td>123.35</td>
<td>101.32</td>
<td>693.31</td>
</tr>
<tr>
<td>Left Elbow Angular Velocity</td>
<td>(Deg./s)</td>
<td>267.97</td>
<td>69.777</td>
<td>179.3</td>
<td>475.06</td>
</tr>
<tr>
<td>Right Elbow Angular Velocity r</td>
<td>(Deg./s)</td>
<td>340.26</td>
<td>85.05</td>
<td>162.61</td>
<td>621.89</td>
</tr>
</tbody>
</table>

In light of what was stated in the preliminary presentation of the application of the multiple linear regression model, Table (3) includes a presentation of the results of the analysis of variance of multiple linear regression to determine the level of reliability of the results of the estimates for the parameters of the model subject to the prediction represented by testing the quality of the fitment of the aforementioned model by identifying the updated effects of the explanatory variables in the function variable and expressed in the hypothesis of the covariance test, where the results of the analysis indicate the success of the reliability of the adopted model with a high degree of significance. The level of reliability, to a high degree, reflects the construction of the prediction model in question.

Table 3. Shows the results of the analysis of variance for multiple linear regression of the variables

<table>
<thead>
<tr>
<th>ANOVA for regression analysis</th>
<th>C.S.(*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.O.V.</td>
<td></td>
</tr>
<tr>
<td>Sum of Squares</td>
<td></td>
</tr>
<tr>
<td>d.f.</td>
<td></td>
</tr>
<tr>
<td>Mean Square</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td></td>
</tr>
<tr>
<td>Sig.</td>
<td></td>
</tr>
<tr>
<td>Regression</td>
<td></td>
</tr>
<tr>
<td>18.907</td>
<td>6</td>
</tr>
<tr>
<td>3.151</td>
<td>17.084</td>
</tr>
<tr>
<td>0.000</td>
<td>Sig.</td>
</tr>
<tr>
<td>Residual</td>
<td></td>
</tr>
<tr>
<td>4.058</td>
<td>22</td>
</tr>
<tr>
<td>0.184</td>
<td></td>
</tr>
</tbody>
</table>

Predictors: (Constant), X1, X2, X3, X4, X5, X6 and X7

The dependent variable represented by (Y)

HS: high significant with significance <0.01

Based on the above, Table (4) includes estimates of some of the multiple linear regression analysis coefficients with the estimates represented by the multiple correlation coefficient between the model function variable with the explanatory changes, the determination coefficient, the corrected determination coefficient and the standard error of the aforementioned parameter.

Based on the above, Table (4) contains estimates of some of the multiple linear regression analysis coefficients represented by the multiple correlation coefficient between the model function variable with the explanatory changes, the determination coefficient, the corrected determination coefficient and the standard error of the aforementioned parameter.
Table 4. Shows some estimates of the multiple linear regression model for the combined variables with conversion in degrees

<table>
<thead>
<tr>
<th>Model Summary</th>
<th>R (Correlation Coeff.)</th>
<th>R Square (Determination Coeff.)</th>
<th>Adjusted R Square</th>
<th>Std. An error of the Estimate</th>
<th>Durbin Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.907</td>
<td>0.823</td>
<td>0.775</td>
<td>0.4294</td>
<td>1.591</td>
</tr>
</tbody>
</table>

Predictors: (Constant), X1, X2, X3, X4, X5, X6 and X7

Where the degree of the relationship between the effect of the explanatory variables represented by (the special strength of the knee joint and the shoulder the angular velocity of the elbows) with the model function variable represented by the overwhelming skill variable is the perfect total correlation (0.907) and the determination coefficient (0.823), which indicates the percentage value to interpret the effect of the explanatory variables For the updated changes with the values of the model function variable, and the corrected determination coefficient that explains the percentage of the updated changes by the values of the model function variable after removing the effect of lack of compatibility from the residual limit sources in the said model.

Finally, Table (5) includes presenting the results of multiple linear regression analysis with estimates to build a prediction model for the level of performance accuracy development of the spiking skill.

Table 5. Shows estimates of the coefficients of the Multiple Linear Regression Model for the Skill Spiking function

<table>
<thead>
<tr>
<th>Multiple Linear Regression Analysis with weighted Estimations</th>
<th>Coefficients</th>
<th>Standardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t-test</th>
<th>Sig.</th>
<th>C.S.</th>
<th>Confidence level</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td>t-test</td>
<td>Sig.</td>
</tr>
<tr>
<td>X1</td>
<td>0.003</td>
<td>0.001</td>
<td>0.446</td>
<td>2.638</td>
<td>0.015</td>
<td>HS</td>
<td>0.985</td>
</tr>
<tr>
<td>X2</td>
<td>0.004</td>
<td>0.001</td>
<td>0.439</td>
<td>3.257</td>
<td>0.004</td>
<td>HS</td>
<td>0.996</td>
</tr>
<tr>
<td>X3</td>
<td>0.003</td>
<td>0.002</td>
<td>0.193</td>
<td>1.270</td>
<td>0.217</td>
<td>NS</td>
<td>0.783</td>
</tr>
<tr>
<td>X4</td>
<td>0.001</td>
<td>0.001</td>
<td>0.075</td>
<td>0.501</td>
<td>0.621</td>
<td>NS</td>
<td>0.379</td>
</tr>
<tr>
<td>X5</td>
<td>0.001</td>
<td>0.001</td>
<td>0.046-</td>
<td>0.440-</td>
<td>0.664</td>
<td>NS</td>
<td>0.336</td>
</tr>
<tr>
<td>X6</td>
<td>0.000</td>
<td>0.001</td>
<td>0.044-</td>
<td>0.425-</td>
<td>0.675</td>
<td>NS</td>
<td>0.325</td>
</tr>
<tr>
<td>(Constant)</td>
<td>-1.092</td>
<td>1.020</td>
<td>1.070</td>
<td>0.296</td>
<td>NS</td>
<td>0.704</td>
<td></td>
</tr>
</tbody>
</table>

Predictors: (Constant), X1, X2, X3, X4, X5, X6 and X7

NS: no significant with significance greater than 0.05, HS: significant with significantly less than 0.01.

Despite the insignificance of the differences under the significant level of significance (0.05) for the coefficients of the multiple linear regression model, the levels of the computed significance came very close to the adopted level of significance less than (0.05), especially about (Right Knee Force). The importance of these stages in explaining what the results of the accuracy of the spiking skill will lead to, similar to the rest of the previous stages, and the model below represents the final version of the prediction model that will be constructed.

\[ \hat{y}_i = -1.092 - 0.003 X_{1i} + 0.004 X_{2i} + 0.003 X_{3i} + 0.001 X_{4i} + 0.001 X_{5i} \]

Where she indicates:

X_,_1i: refers to the results of the aggregate relative values of the Left Knee Force variable.
X_2i: to the results of the aggregate relative values of the Right Knee Force variable.

X_3i: refers to the results of the aggregate relative values of the Left Shoulder Force variable.

X_4i: refers to the results of the aggregate relative values of the Right Shoulder Force variable.

X_5i: refers to the results of the aggregate relative values of the Left Elbow Angular Velocity variables.

X_6i: to the results of the aggregate relative values of the Right Elbow Angular Velocity variables.

ŷ_i: to the results of the aggregate relative values of variables.

Through Table (5), it was found that (Right Knee Force), (Left Knee Force), Left Shoulder Force and (Right Shoulder Force) are measured. And (Left Elbow Angular Velocity and Right Elbow Angular Velocity) is the physical variable contributing to the independent variable the overwhelming multiplication and the contribution percentage has reached (1.092), and thus the equation of the predictive regression line.

It appears from the determination coefficient that recorded a relatively high level, which indicates that the study factors explain the changes occurring in the variables (Right Knee Force, Left Knee Force, Right Shoulder Force, Left Elbow Angular Velocity and Elbow Angular Velocity), with the model function variable represented by the accuracy variable The overwhelming multiplication and other factors (remainders) constitute a lower percentage than the average. And that this model measures the actual reality achieved in the occurrence of impact levels resulting from indicators of strength and speed that affect the accuracy of spiking performance by displaying the results of the correlation coefficients and it must be noted that the statistical relationships related to (Right Knee Force, Left Knee Force and Right Shoulder Force, Left Elbow Angular Velocity and Left Elbow Angular Velocity).6

"The association of force with speed leads to the result in a form of force, which is called" quick force ", which is the complex form of force and speed at times and speed and force at other times. It is called (force distinguished by speed) or (quick power),7 and that the presence of any defect in any indicator will directly reflect the speed and accuracy of the overwhelming hitting, which is one of the important foundations and rules on which the player relies and thus the success of the spiking hitting. It is clear from the results of the predictive equation for the spiking hitting about the extent of the common disparity between the variables.8 The independent variable, with the model function variable represented by the spike accuracy variable and the other factors (remainder), and this in itself is evidence of the importance of these variables, which reflect the extent of the player's need to pay attention to the accuracy of spiking, especially the Right Knee Force, followed by (Left Knee Force and Left Shoulder Force. Force) meaning that strength is one of the most important variables in determining the accuracy of shooting, as the player can use these variables, as this factor is one of the most important factors affecting the length of the accuracy of the spiking hit, and "There is a relationship between some forms of power and the Motor performance " and the results9. The special muscle strength aims to develop the amount of muscle strength of the muscles that work mainly in the specialized sport of the individual. To develop the types of muscle strength according to the percentage of their contribution to the specialized performance, and the muscles are mainly qualified in the kinetic performance of the sport, the practice of competition exercises. the performance.

V. CONCLUSIONS

1. (Right Knee Force.) Variable shares, with the highest contribution by spiking volleyball accuracy

2. The variants (Right Knee Force, Left Knee Force, Right Shoulder Force, Left Elbow Angular Velocity, and Right Elbow Angular Velocity) contributed positively to the accuracy of spiking from the upper and lower left.

3. The (Left Knee Force) variants made a negative contribution with spiking accuracy

4. The prediction equation is arrived at(ŷ_i = -1.092-0.003 X_1i + 0.004X_2i + 0.003X_3i + 0.001X_4i + 0.001X_5i).
REFERENCES