FINDING A PREDICTIVE VALUE FOR THE ACCURACY OF SHOOTING CLOSE FROM JUMPING IN TERMS OF SOME VARIABLES OF THE KINEMATIC VELOCITY OF YOUNG HANDBALL PLAYERS

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The research included four chapters. The first chapter contained the introduction to the research and its importance, and the handball game was dealt with from competitions with complex technical performance and shooting skill, which depend on a high level of strength and speed, which made the interest in understanding the stages of the performance of the stage of angular velocity and finding a predictive value of great importance, since this stage affects the accuracy of aiming on the target from the left side. Contribution of variants of angular velocity for shoulders and elbows, the aim of the research is to find predictive equations with the level of development in terms of the regression of the values of the variables. The sample of the research is represented by the players of the specialized school of handball, and the use of imaging and mechanical analysis is not to extract the results.

Keywords: Predictive value, handball players

I. INTRODUCTION

The process of using different sports sciences to reach the high level came as a result of concerted scientific efforts that depend on research and field studies to solve everything that hinders the march of progress and scientific development, and the use of advanced technology in the study of sports movements and to identify weaknesses in performance and address them, and as a result, worked to help trainers identify the degree of employing training variables to evaluate performance, develop achievement and raise it to the highest levels, and bio-mechanics was used with other sciences to develop scientific solutions to the problems that teams suffer from in sports games by studying the forces that affect the performance of players. Most of the international teams took a share in this development by adopting a scientific mechanism by 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 correction by preparing special training programs and using kinetic analysis through quantitative analysis that depends on finding variables Influencing performance that requires us to use technical tools and devices. Thus, through this science, we can identify the main lines of skillful performance down to the subtleties of matters. Angular velocity is one of the most important variables that have an influential and effective role in achieving the maximum power and speed of the skill of correction and thus achieving the greatest possible success in achieving the goal through the correct implementation of the technical stages of this skill, which require the application of the basic conditions due to their connection to the previous and subsequent technical stages, whose boxes are many one of the basic skills, and perhaps one of the most prominent is the skill of shooting by jumping high from the left side, as it is one of the most important skills that the accuracy of its performance effectively contributes to determining the outcome of the match, so the researcher worked on this topic with research and analysis through knowing the angular velocity according to the (Biosyn System), which is one of the options that leads us to obtain accurate outputs in everything related to the characteristics of the motor path, the skill of shooting by jumping high from the left side and improving performance. Hence the importance of the research in opening new scientific horizons to help coaches develop special exercises for players to reach good skillful performance of the skill of shooting by jumping high from the left side, according to the findings of the researcher regarding the characteristics of angular velocity, its relationship, and the percentage of its contribution to the accuracy of correction. Which must be compatible with the players' abilities and invest their physical, physical and skill potentials to reach the best levels, if the technical
performance is the key to achieving its distinctive technical level, and this is what prompted the researcher to work to find these values, as understanding the performance stages of the scoring stage of the jump is formed. It is of great importance that this skill is one of the skills most used in scoring and influencing results, and knowledge of biomechanical variables will contribute to organizing and directing training operations and giving indicative points to coaches to design training programs to perform the skill by revealing weaknesses and strengths and giving the necessary treatment and forecasting what the player can achieve. In the future, movements with a high degree of difficulty in a relatively short period of time, according to research indicators.

Research problem:

Through the researcher's practice as a former player and teacher and her experience in that game as a witness to the performance of the players and her knowledge of many sources and studies on handball in addition to the researcher noted the skill of shooting by jumping high from the left side depends on multiple biological mechanical foundations, the most important of which is everything related to the performance variables of body movements before. The player from the moment of preparation to the moment of scoring, which prompted the researcher to study the angular velocity variables of the shoulders and elbows according to the (Biosyn System) and its relationship to the accuracy of correction of the players on the left side of the players of specialized schools of handball in order to find out the relationship between the characteristics of the angular velocity variables of the shoulders and elbows and the accuracy of the correction by jumping high for the upper and lower target angles.

Research objectives:

Identify the predictive values of the ratio of the angular velocity contribution to the shoulders and elbows with accuracy of aiming the upper and lower target angles on the left side of handball players.

Identify the effect of each variable of the angular velocity of the shoulders and elbows with accuracy of shooting the upper and lower target angles on the left side of handball players.

Research fields:

The human field: (7) Players representing the specialist center.


Spatial field: The Specialized Center for Handball Sports Talent in the Ministry of Youth.

II. RESEARCH METHODOLOGY AND FIELD PROCEDURES:

Research Methodology:

The researcher used the descriptive approach in the manner of correlational relations for the purpose of reaching scientific facts based on correct objective foundations for its suitability to the nature and objectives of the research. (1)

Community and sample research:

The sample of the research was represented by the specialized school players and the selection of (7) players by the deliberate method as they represent the community of origin, and homogeneity was made for the members of the research sample in (age, weight, height, training age) as they were adjusted by using the torsion coefficient (2).

Table (1) shows the homogeneity of the sample.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Measuring unit</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Deviation</th>
<th>Skewness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>Cm</td>
<td>179.14</td>
<td>179</td>
<td>3.579</td>
<td>0.621</td>
</tr>
<tr>
<td>weight</td>
<td>Kg</td>
<td>68.571</td>
<td>68</td>
<td>2.299</td>
<td>0.390</td>
</tr>
<tr>
<td>----------</td>
<td>--------</td>
<td>--------</td>
<td>------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Age</td>
<td>Year</td>
<td>15.714</td>
<td>16</td>
<td>0.7559</td>
<td>0.595</td>
</tr>
<tr>
<td>Training age</td>
<td>Year</td>
<td>2.571</td>
<td>3</td>
<td>0.5345</td>
<td>0.374</td>
</tr>
</tbody>
</table>

It is clear from Table No. (1) that the values of the torsion modulus of the above measurements are limited to $(\pm 3)$, which indicates 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. (3)

**Devices, tools and methods used in the research:**

**Methods of data collection:**
- Arab and foreign sources.
- World Wide Web Resources (Internet).
- Personal interviews and scientific advice.
- Observation and analysis.

**Devices used in the research:**
- A rapid analysis camera, number (2) type (Casio) with a frequency of (1000) images / second.
- Tripod (1) with a movable (Shario) stand.
- Biosyn system.
- A computer.
- Scale (1) meter.
- A tape measure.
- Iron squares measuring (50x50) cm, count (4).
- Japanese medical scale.

**Exploratory experience:**

In order 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 fast video camera, provided by the system, it measures the angular velocity, and attaching the sensors to the player's body by means of rubber belts, and after installing the sensors on the player's body, to photograph the movements with two (Casio) cameras, one of which reaches a speed of 240 images / second, where the distances, dimensions and heights of the appropriate analysis cameras have been fixed to cover the locations of cameras all aspects of the artistic movement of the skill performed.

**Tests used:**

**Jumping Aiming Accuracy Test.**(4)

**The purpose of the test**: Measurement is the accuracy of a close-up shot.

**Tools**: (10) hand balls, a goal drawn on the wall inside which are five circles with a diameter of (60 cm) four of them are drawn in each corner and the fifth is drawn in the middle below the beam.
Performance description: The laboratory stands with a ball behind a line of (1 m) long drawn on the ground parallel to the wall on which the target is drawn and at a distance of (7 m) from the wall. In the upper right corner, then the middle left, then to the lower right corner, then the lower left corner.

Note: Give two attempts on each area, 1 point is given for a correct shot and zero for faulty.

Main experience:
After the data obtained by the researcher from the reconnaissance experiment, she distributed the work team and places where the camera was placed. The main experiment was conducted on (7) players on Wednesday, 4-10-2019 at (4) in the afternoon. 6 attempts were adopted with the highest achievement.

Videography:
The camera (1) type (Casio) at a speed of (1000) p/s was set at a speed of (240) p/s. It depicts the movement of the player from the side and at a distance of (8) m from the path of the player's movement at a height of (1.50) meters.

The camera (2) type (Casio) at a speed of (1000) p/s was set at a speed of (240) p/s, filming from the side and at a distance of (8) m from a path of movement with a height of (1.20) meters from the opposite side, using the scale. With a length of (1 m). And placing phosphorescent marks on the player's body.

Biosyn Systems:
To evaluate the biomechanical indicators of the three-dimensional mathematical motions analysis system, the Biosan 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 kinetic 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 speed of signal transmission between the sensor and the program, which is estimated at (100 information per second), to calculate time, it can be synchronized with a fast video camera (100 pictures per second), and the system consists of a motion analysis program, the sensors number (17), a transmitter and a signal receiver, the central sensor for the measurements provided by the system is measurements of the angles of the body parts and not the joints, the angular velocity, force generated on each joint, force torque, power, pressure under the feet, and data are collected at a rate of (100) Hz and the transmission range is at a rate of (20 m) in any direction.

System work:
After installing the sensors on the player's body, the device captures the player's picture, 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. You must also choose a symbol for each player for the purpose of saving the player's data. The device stores it on a large capacity (SD) card that allows recording for a number of 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 a system of integrating the velocity and the action of gravity and allows to detect the angular displacement of the body's biomechanical action and display according to the kinematic and kinetic data in its real position with multiple virtual images of the movement of the body and give 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 imaging mechanism (100 images per second). Signal, the central sensor for the measurements provided by the system, it measures the angles of the parts of the body, not the joints.

Statistical means:
The researcher used statistical questions through the statistical package (SPSS) statistical packages for social systems and by using the relevant statistical laws.

Statistical Laws:
- Mean.
- Std. Deviation.
• Standard error.
• Simple Linear Regression.

Presentation, analysis and discussion of results:

Multiple linear regression analysis:

Estimates of some coefficients of multiple linear regression analysis:

Based on the above, table (4) includes 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>
<thead>
<tr>
<th>N</th>
<th>Variables</th>
<th>Measuring unit</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>R</th>
<th>Sig</th>
<th>Rate the contribution ratios</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>R</td>
<td>R .S</td>
<td>Def. Std.</td>
</tr>
<tr>
<td>1</td>
<td>High left accuracy</td>
<td>Point</td>
<td>6.80</td>
<td>1.20</td>
<td></td>
<td>.R .S .Def. Std.</td>
<td>F</td>
</tr>
<tr>
<td>2</td>
<td>The angular velocity of the left hip point</td>
<td>Degree / s²</td>
<td>34.81</td>
<td>12.86</td>
<td>-.02</td>
<td>.47</td>
<td>.76</td>
</tr>
<tr>
<td>3</td>
<td>The angular velocity of the right hip point</td>
<td>Degree / s²</td>
<td>47.17</td>
<td>8.83</td>
<td>.69</td>
<td>.00</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>The angular velocity of the left knee</td>
<td>Degree / s²</td>
<td>143.36</td>
<td>28.41</td>
<td>-.11</td>
<td>.32</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Right knee angular velocity</td>
<td>Degree / s²</td>
<td>217.05</td>
<td>36.33</td>
<td>.39</td>
<td>.04</td>
<td></td>
</tr>
</tbody>
</table>

Significant at (Sig) <(0.05).

From Table (1) it can be seen: There is a direct correlation of the angular velocity variable for the hip point and the right knee with the aiming accuracy of the upper left side of the target, meaning the higher the angular velocity value of the hip point and the right knee, the greater the accuracy of the aiming for the upper left side of the target. It is evident from the table also that the studied variables contributed to the accuracy of correction to the upper left side of the target.

Presentation the results of multiple linear regression analysis with weighted estimates to build the prediction model:

Table (2) Evaluate the effect of angular velocity variables with the accuracy of aiming at the upper right of the target.

<table>
<thead>
<tr>
<th>N</th>
<th>Variables</th>
<th>Value (B)</th>
<th>H</th>
<th>T value</th>
<th>Sig level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fixed limit</td>
<td>1.227</td>
<td>1.870</td>
<td>.656</td>
<td>.522</td>
</tr>
<tr>
<td>2</td>
<td>The angular velocity of the left hip point</td>
<td>-.005</td>
<td>.017</td>
<td>-.273</td>
<td>.788</td>
</tr>
</tbody>
</table>
The angular velocity of the right hip point | .085 | .025 | 3.331 | .005
---|---|---|---|---
The angular velocity of the left knee | -.005 | .008 | -.608 | .552
Right knee angular velocity | .011 | .007 | 1.648 | .120

Impact value at (Sig) <(0.05).

Where the degree of the relationship between the effect of the explanatory variables is evident, represented by (angular velocity of the left and right shoulder and angular velocity of the left and right elbows), with the model function variable represented by the correction precision variable for the upper and lower left side, which explains the percentage of the changes introduced by the values of the model function variable after removing a trace Lack of compatibility from the sources of the residual limit in the mentioned model.

The template below is the final version of the built-in forecasting model.

\[
y_i = 1.227 - 0.005 X_{1i} + 0.085 X_{2i} - 0.005 X_{3i} + 0.011 X_{4i}
\]

Where indicates:

\(X_{1i}\): To the results of the aggregate relative calibration values for the left shoulder angle velocity variable.

\(X_{2i}\): To the results of the aggregate relative calibration values for the right shoulder angle velocity variable.

\(X_{3i}\): To the results of the aggregate relative calibration values of the left attachment angle velocity variable.

\(X_{4i}\): To the results of the aggregate relative calibration values for a variable right angle speed attachment.

\(\hat{y}_i\): To the results of the aggregate relative calibration values of the aiming accuracy variable for the upper and lower left side.

**Discuss the results of the prediction equation:**

It appears that the coefficient of determination has recorded a relatively high level, which indicates that the study factors explain the changes occurring in the variables (left shoulder angle velocity, right shoulder angle velocity, left elbow angle velocity and right elbow angle velocity), with the model function variable represented by the aiming accuracy variable the left upper and lower left and other factors (remainder) constitute a smaller proportion of the average, and that this model measures the actual reality achieved in the occurrence of impact levels resulting from the speed indicators that affect the accuracy of the performance of the upper and lower left aiming by displaying the results of the correlation coefficients and it must be noted that the statistical relationships related to (left shoulder angle velocity and right shoulder angle velocity left elbow speed and right elbow speed), each indicator is a speed indicator and complements the other. Here (Adel Muhammad Dahsh) notes, “Speed is related to the mechanical foundations of movement, which are represented in the position of the center of gravity, the line of force action, the angles of the muscular action and the length of the motor path, in
addition to the work of levers and inertia” (1). and that the presence of any defect in any indicator will be directly reflected in the speed and accuracy of correction, which is one of the important foundations and rules on which the player relies and thus the success of the correction. It is evident from the results of the correction prediction equation about the extent of the common variance between the independent variables, with the model function variable represented by the shooting accuracy variable on the left side and the other factors (remainder) and this in itself is evidence of the importance of these variables that reflect the player’s need to pay attention to the shooting accuracy variables, especially Speed of shoulders and elbows, here (Talha Husam al-Din) explains, ”As the angular movement of a body differs in that the velocity of the parts varies according to their distance from the axis of rotation. That is, the aim of focusing on the importance of the angular velocity is reflected in the amount of linear velocity and when the object moves on the circumference of a circle and cuts a distance equal to the radius of the circle.” The angle the object moves is equal to the radial angle “ (2). That is, speed is one of the most important basic variables in determining the horizontal or vertical distance for accuracy of scoring, and it also determines the height that the body reaches, meaning that the speed as a result of the player’s strength affects the accuracy of shooting, where the player can use these variables, as this factor is one of the most important factors affecting shooting accuracy length.

III. CONCLUSIONS:

- Variable arrows (right shoulder angle velocity), with the highest percentage contribution with aiming accuracy from the upper and lower left side.
- The variables (velocity of right arm shoulder angle and right elbow angle velocity) contributed positively to the accuracy of aiming from the upper and lower left sides.
- The variables (left arm shoulder angle velocity and left arm elbow angle speed) contributed negatively to the sightseeing accuracy.
- The prediction equation is arrived at: Correction accuracy from the upper and lower left(1.227) = -0.005 + 0.085 - 0.005 + 0.01

Recommendations:

- Paying attention to the percentage of contributions shown by the study for each of the variables stages of biomechanical performance in the skill of correction from the upper and lower left sides
- Approval of the percentage of contributions shown by the study for each of the variables, the stages of biomechanical performance in the skill of correction from the upper and lower left sides
- Adopting the prediction equations that were reached in evaluating the levels of Iraqi players

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