Analytical study of some of the achieved angles of the final throwing stage and their relationship to achievement in the effectiveness of the advanced javelin throw

[1]Omar Abdulelah Salama; [2]Jamal Abdulkareem Hameed; [3]Ziadoon Salah Raheem

Abstract

In many studies and research, researchers deal with the study of angles occurring in the various joints of the body during performance, and how the change in these angles can be linked to the educational and training principles of most mathematical skills in order to know the correct mechanical position of movement and thus achieve the best achievement depending on the angles, and the study aimed to know the proportion the contribution of angles achieved on the one hand and digital level on the one hand , and also to find out the correlation between them on the other hand, suppose researchers to a high contribution ratio between the angles achieved to the stage of shooting digital level players javelin throw young people, because the researchers used the descriptive approach in a manner correlation of relevance nature of the research, was Selection of the research sample by the intended method, and the number was (4) players from Diyala club For the sports season (2020-2021) and their ages were under (18) years old, and the research procedures included imaging procedures, tests and measurements used in the research, which included research variables measuring the angle of approach, thrust and momentary thrust at the moment of throwing, as well as the digital level, the field application was done on the research sample after conducting the experiment Exploratory.
Key words :Checked Angles „Javelin Throwing.

Introduction

The philosophy followed in dealing with the human body through the study of mechanical analysis based on biological analysis, It relies on scientific attempts to study the interconnectedness between sports training processes and methods of improving the tools and requirements of the athlete, which help him in obtaining the most appropriate movement paths and according to the movement limits that he performs and in the economic form of all levels of training. Knowing the basic information that goes into building most of the mechanical laws used In mathematical skill and the relationship of each one of them to the mathematical aspect, and this fact leads us to know each of (time - displacement - mass) through which information can be available to us about the details of the exercise used, for example to develop speed or exercises that develop acceleration and its relationship to the development of strength or groups The muscle responsible for this development in order to set the parameters that govern this

[1,2,3] University of Diyala College of physical education and sport science
omar.abdulelah@uodiyala.edu.iq; sport-46@uodiyala.edu.iq, Zaidoun.salah@uodiyala.edu.iq

development (**Ahmed, 2018**) . As the angle analysis requires measuring the angle of one part of the body compared to the other part of the body that is connected to the joint, and the tradition followed to measure the relative joint angles is what is in place in the position of the anatomical signal where all the angles are at zero degrees and the movement of the joint will be measured directly, and the relative angle It is an angle in the joint formed between the longitudinal axis of adjacent body sections, and the absolute angle is the angular inclination or bending of a part of the body with respect to the fixed signal line, as the absolute angles must be measured in the same direction from the single signal either vertically or horizontally (**Hill , 2014**) . As the effectiveness of the javelin throw is characterized by its complex technical performance that contains several movement stages linked to each other in the interest of the final achievement of this game, which is achieved through the integration of these stages, so it is necessary for researchers, trainers and those concerned to study the biomechanical variables that characterize the spearman in all parts of his body In particular, and in the dynamic appearance in general, which is represented from the beginning of the technical performance to its end, in order to reach the factors that directly and chiefly enter into achieving the best performance and then achieving the best achievement (**Hussein, 2015**) . Considering researcher Wen that there is a lack of research that dealt with particular mechanical specifically variables put flinging one hand , and to determine the proportion of its contribution to the achievement of the other through the use of kinetic analysis technique Despite the achievements in the effectiveness of throwing a spear at the local level , but the digital level is still A more in-depth and scientific study needs to be studied due to the divergence of the local number from the current international numbers (Asian and international), and this is inevitably due to the fact that there is a defect in achieving the mechanical conditions accompanying the performance in the effectiveness of the javelin throw, so the importance of this study came in determining the percentage of the contribution of the most important biochemical variables for the throwing stage In the effectiveness of the javelin throwing, specifically the final throwing stage, and the extent to which these mechanical variables are interconnected in the parts of the shooter's body within these stages in a manner consistent with achieving the best mechanical conditions for him that serve performance and achievement. The study aims to identify the angles realized values for the stage of throwing the javelin players to applicants, on the one hand , and also to know the contribution of angles values achieved for the shooting stage and achievement of the players throw the javelin to applicants on the other hand .

Methodology

Research Methodology: The researcher used Wen descriptive methods and method of the survey manner Relational relations score for the phenomenon to be studied.

The research sample: The researcher Wen choose the sample purposively from the research community of my players Diyala Club Javelin Throw young participants in the clubs of Iraq and institutions Athletics Championships in 2019, which was held at the stadium of athletics at the National Center for the care of sports talent of the Ministry of Youth and Sports in the capital Baghdad , As the number of the research community reached 4 players, and the sample represents (53.33%) of the research community.

Table (1) shows the homogeneity of the research sample

T	variable	measuring unit	s	± sd	Mediator	skewers
1	Age	Year	24.50	1.51	24,50	1,496
2	Age of training	Year	8,25	1,48	8	1,178
3	Apparent weight	Kg	87,12	2,41	87	0,049

4	Length	meter	1.80	3.16	1.81	0.434-
5	Achievement	meter	59,78	3,51	58,95	0,269

Methods for gathering information: Foreign and Arab sources and the international network of information.

Observation and experimentation.

Tools and devices used: The researchers used the most important tools and devices in the subject of the research in order to conduct field research procedures, which are:

- Japanese origin type video camera (Exillim High-speed (400) p/s with an external storage unit.
- Electronic device for measuring length and mass number (1).
- LAPTOP TYPE CALCULATOR (Lenovo).
- Manual type stopwatch (Casio Number (1).
- Metric tape measure (number) 1) Colored adhesive tape, phosphorescent markers, scale, kinematics software (kenova).

Determination of field research variables and procedures: - Includes imaging procedures, tests and measurements used in the research, and for the purpose of controlling the research variables to be extracted using kinematic analysis techniques . The basic test from which the angular variables in question were extracted is the complete throwing test by giving (3) attempts for each shooting and filming The last step with a scientific imaging camera speed is 400 p / s, and the speed of the camera was fixed to (210 p / s) considering this speed corresponds to the speed of the player's performance and the speed of the spear when launching, and the researcher placed this camera on the right side of the archer who uses his right arm and vice versa was The distance of the lens of this camera is (6.10 meters) from the target's path in the field of shooting and the height of the focus of the camera from the ground is 1.20 meters, as this distance was fixed through the reconnaissance experiment to ensure the clarity and integrity of the image, and the searched parameters were extracted using the kinematic analysis program (kenova Included as follows:

1. **Inclination angle of the body to approach**: these angles between the longitudinal line of the body passing from the focal point is measured and the center of the weight of the body for the moment pivot with the line vertical (gravity line) pass - through from the focal point (foot focal) moment touched foot front ground during the last step Waller Mai .
2. **The angle of inclination of the body by thrust**: These angles are measured between the longitudinal axis of the object passing from the fulcrum and the center of gravity of the body at the moment of thrust with the vertical line (the line of gravity) passing through the fulcrum (the pivot foot), during the last step and the throwing.
3. **The angle of inclination of the trunk approach**: It is the angle between the trunk line (from the point of the shoulder joint to the point of the hip joint) with the vertical line with the hip joint approaching the moment the front foot touches the ground.
4. **The angle of inclination of the trunk by thrust**: is the angle between the line of the trunk (from the point of the shoulder joint to the point of the hip joint) with the vertical line of the thrust when the javelin left the aiming arm. (**Thamer, 2009**)
5. **The angle of the knee of the stern leg (the moment the left leg touches the ground**): It is the angle between the thigh line (from the hip joint point to the knee joint point) and the leg line (from the knee joint point to the ankle joint point) for the left leg at the moment of touching the ground in the last step. (**Al-Janabi, 2018**)

6. **The knee angle of the leg of the left leg at the tight arch**: is the angle between the thigh line (from the point of the hip joint to the point of the knee joint) and the leg line (from the point of the knee joint to the ankle joint point) for the left leg of the left leg The moment of the tight arc at the furthest extension of the arm.

7. **The knee angle of the stern leg at the starting of the spear**: It is the angle between the thigh line (from the hip joint point to the knee joint point) and the leg line (from the knee joint point to the ankle joint point) of the leg at the moment of launch.

8. **The flexor angle of the aiming arm is an individual focal point**: It is the angle between the forearm line (from the point of the wrist joint to the point of the elbow joint) and the homers line (from the point of the elbow joint to the point of the shoulder joint) of the aiming arm at the moment of individual fulcrum   .

Main experience: The main experiment was conducted after completing the exploratory experiment and ensuring the validity of the equipment and tools, as this experiment was conducted on the arena and field games stadium in Diyala club stadium at three in the afternoon, and each player was given (3) attempts according to the international activity law, which gives (3) attempts If the number of players is (8) or less, and an interval between attempts is (3-4) minutes.

Statistical means: we use statistical pouch (spss) to extract search results.

Presentation, analysis and discussion of results:
Presentation and discuss the results of the quantitative value of the angle and achievement variables

1.   **View of the description of the statistical variables of angles and achievement analyzed and discussed:**

Table (1) Shows the statistical description of the angle and achievement variables.

Variables	measuring unit	Middle of my account	Standard error	mediator	Standard deviation	Torsion coefficient
XD	meter	59.781	0.879	58.950	3.516	0.269
The angle of inclination of the object approaches	Degree	33.688	0.656	33.500	2.626	0.742
The angle of inclination of the body by thrust	Degree	38.188	0.319	38,000	1.276	-0.837
The angle of inclination of the torso approaches	Degree	36.563	0.418	37,000	1.672	0.120
The angle of inclination of the trunk by thrust	Degree	30.188	0.476	30,000	1.905	1.149
The knee angle of a man standing at the moment of touching the ground	Degree	165.313	0.757	164.500	3.027	0.087
The knee angle of the support leg is at the taut arc	Degree	154.563	0.555	154.500	2.220	-0.283

The knee angle of the leg when taking off	Degree	164.813	0.421	165,000	1.682	-0.337
The elbow angle of the aiming arm is individual	Degree	153,000	1.041	152.500	4.163	0.190
The elbow angle of the aiming arm at maximum flexion	Degree	128.188	1.336	128,000	5.344	-0.239

Table (1) shows the descriptive statistics of achievement and the variables the angles of the body for the javelin throwers, as there are very important indicators. It is possible to infer the moderation of the research sample on the standard error curve (kaus), which is that all the values of the arithmetic mean were greater than the values of the standard deviations in addition to the value of the standard error which constitutes the second indication of moderation, but the most important and finally the values of the torsion coefficient, which ranged between (±2)

2. **Display arithmetic mean results, standard deviations, correlation coefficient, error rate of achievement, and angle variables for javelin players:**

Table (2) shows the simple correlation coefficient and error ratios of the angle and achievement variables for javelin players.

Variables	measuring unit	Center	Standard deviation	Correlation coefficient	
XD	meter	59.781	3.516		
The angle of inclination of the object approaches	Degree	33.688	2.626	0.443	0.085
The angle of inclination of the body by thrust	Degree	38.188	1.276	-0.095	0.726
The angle of inclination of the torso approaches	Degree	36.563	1.672	-0.472	0.065
The angle of inclination of the trunk by thrust	Degree	30.188	1.905	0.294	0.269
The knee angle of a man standing at the moment of touching the ground	Degree	165.313	3.027	-.605- *	0.013
The knee angle of the support leg is at the taut arc	Degree	154.563	2.220	0.314	0.236
The knee angle of the leg when taking off	Degree	164.813	1.682	-0.056	0.836

Table (2) shows the values of the descriptive statistics of the research sample and the simple correlation coefficient between the variables of body angles and the achievement of the javelin players as it was found that there are four significant correlation coefficients where the error rate was less than the level of significance (0,05)   The highest significant correlation between achievement and the variable of the knee angle of the support man at departure was reached and ranked second in terms of the coefficient of correlation between achievement and the variable of

the elbow angle of the aiming arm at the maximum flexion and then came after the moral relationship between achievement and the variable of the knee angle of the support man at the moment of touching the ground and all these correlations were in the direction exponential, either the relationship between achievement and variable angle attached to an arm aimed at the individual rank came built upon the latest in terms of strength of correlation coefficient and the direction of the exponential, either non - moral relations between achievement and variables body angles for players javelin throw was number (8(Variables as the percentage of their error is greater than the level of significance(0,05)

3. **View multi - link relationship and the proportion of the contribution and the standard error for checking the quality of the model to reconcile multiple linear regression angles between the variables and achievement of the players javelin throw:**
   Table (3) the multiple correlation coefficient, the contribution ratio, and the standard error of the estimation for the angle and achievement variables are shown.

Model	Multiple link	Contribution ratio	Standard error of estimation
1	0.955	912	2.332

Through Table (3), the multiple correlation coefficients between the angles and achievement variables for the javelin is shown, as the amount of correlation reached (0.955), and this is an indication of the strength of the correlation, which indicates the presence of an effect of the independent variable in the dependent variable with a high contribution rate, as it reached (91%) This is evidence of the strength of the effect between the independent and dependent variable, as well as the acceptance of the alternative hypothesis and the rejection of the null hypothesis. The percentage of (9%) is attributed to other factors.

Discussion

From the above, we have investigated the nature of the correlational relationships between each of the variables studied, the angles of performance and digital achievement, and that these relationships contributed to verifying the purpose of our research, which is to know the correlation and impact of each variable and the predictive value of each of the performance angles and the digital achievement of the players.

It is noticed through displaying the results in Table (2) above that there is a statistically significant relationship between the knee angle variable, the focal point and the achievement, as it is one of the variables that must be taken into consideration to reach the highest value of the starting speed as it works to reduce the horizontal velocity resulting from the approach, which is It is a function of the player's ability to convert kinetic energy to the javelin, and this suspension also helps transfer kinetic energy to the upper end of the body (**jose, 2004**).

Whereas, the extension of the leg helps the shooter to stop and transfer and use the kinetic energy that the player gained from the proximity sprint and convert it into potential energy during stopping and convert it again into a kinetic energy that gains the spear a higher speed for the launch and thus achieving a farther distance (**Abdul Karim , 2009**).

It is also noted through displaying the results, Table (2) above, that there is a statistically significant relationship between the knee angle variable, the man of support, and the achievement, as the researcher sees that this relationship is a logical relationship when the work of contraction and extension of the stooped man is considered a factor that directs the movement of the body.

The above results showed that there is a statistically significant effect on the elbow angle variable for the aiming arm in the individual focal stage, as it is considered one of the variables that affect the throwing distance, as the shooter must at this stage move the body parts away from the axis of rotation as far as possible, i.e. extend the aiming arm A complete span without a large span in the elbow joint to fully take advantage of the principle of the effect of lengthening the radius in order to increase the circumferential velocity of the revolving body, i.e. assist the aiming arm, which works to increase the launch speed of the spear and through this the importance of the elbow angle is evident at this stage through which the radius is lengthened Rotation in order to increase the starting speed of the spear as (**Risan, 1992**) considers the necessity of extending the elbow joint a full extent during this stage.

The researcher believes that the lack of statistical significance and the presence of weak effects between the variables of the angles of kinetic performance and achievement is one of the aspects of the imbalance in the integration of skill performance, which in the researcher's opinion requires that the physical numbers include all the necessary characteristics that play an effective role in the implementation of the technical and kinetic performance of the javelin movement, especially We are dealing with advanced individuals who have a training age that gives them the experience that the performance is in accordance with the necessary and required mechanical conditions to achieve the required thrust in accordance with the mechanical goal of performance, which is to achieve the best horizontal distance of the spear.

The above results indicate a weak, non-significant correlation between these between the angles of inclination of approach, thrust and achievement, and the researcher believes that there is supposed to be a relationship and effect between these angles and achievement, and it is known that all of these variables, especially the angles of inclination of the body for the moments of support and thrust, constitute factors that have a direct effect on Achieving the required strength when the tide is integrated in the joints of the body at the moment of thrust, as well as in the completion of the final phase of the output of force and velocity at this moment, which was mentioned above, in order to integrate the final thrust and achieve the required achievement, and this aspect has formed a gap in the performance of the individuals of the research sample and refers to There is some defect in performance that the members of the research sample can avoid if they were trained on an ongoing basis. By this, the researcher means that it is possible to take advantage of the angles that represent the position of the body for the moments of support and thrust in order for the movement path to be highly fluid and without any defect in order to achieve the ultimate goal of performance.

Also, the position of the body in the last step is considered an accurate and continuous description of the rest of the successive technical conditions that aim to achieve the goal of performance, and thus achieve a good angle of inclination for the body at the moment of placing the foot of the chock to prepare for the process of instantaneous pushing of all the muscles of the body working in this step and this indicates the importance of studying The mechanism of this step in the overall motor performance.

The results also showed that there are no significant correlations between the angle between the two men and the achievement, and this indicates the weakness of the sample members, as it is assumed that there is an inverse relationship between this angle and achievement as this variable is considered one of the good indicators that indicate that the speed of the shooter continues in this The moment is the smallest possible decrease, where the decrease in its value. This angle ensures that the gravitational moment (weight torque) of the moment of fulcrum is as

small as possible, and this reduces the burden on the muscles at this moment and ensures the continuation of its fast and smooth action.

Conclusion

In light of the results achieved, the results showed that the correlation between the variable of the angles of inclination of the body and the trunk with achievement did not rise to the ideal in performance in a way that serves the performance of the members of the research sample through the results that emerged and that the angles of other parts of the body, which represent the position that the archer is supposed to keep With its speed without exaggerated restraint of movement, the correlations were weak, as well as the corners of the facility are not statistically significant with the achievement of the members of the research sample in what is achieved through the results obtained either during the preparatory position or in the position of the maximum bend or in the push position The final and that the ratio of the contribution to the angle variables did not indicate the effectiveness of these variables in achievement. The researcher recommends adopting the equation to extract the predictive value of achievement according to each kinematic variable researched and using kinematic analysis programs in the training units to give real feedback and correct errors, to reach the correct mechanical position and to benefit from the results of the analysis in the real-time periodic review of the player in order to be able to detect weaknesses, strength and position Right mechanic.

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