

Kinematic analysis of vertical jump and its relation to the speed and accuracy of far shooting of three points for Play maker advanced basketball

Researcher

Dr. Shukri Shaker Faleh

University of Basra / College of Physical Education and Sports Sciences

dr.shukri1972@gmail.com

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Abstract :the research importance comes in providing scientific facts about the relationship of vertical jump and its role in achieving the successful shooting of long distances, especially shooting three points, as this shot is one of the most important shots because they make points and considers the interval in winning or losing the game.

By noting the lack of studies to analyze the vertical jump during the far shooting calculated by three points, which it considers the need to study and to know the relationship between the variables of jumping and shooting skill success.

Research Objectives:

- 1- Know the kinematic analysis of the vertical jump and the speed and accuracy of the far shooting calculated by three points for the Play maker advanced basketball.
- 2- Know the relationship between vertical jump and the speed and accuracy of far shooting calculated by three points for the Play maker advanced basketball.

Conclusions:

- 1- The results of the research sample do not rise to the level of ambition in the kinematic variables under study, which affects the speed and accuracy of shooting.
- 2- Vertical jump and increase the vertical distance have a role in achieving the speed and accuracy of shooting.
- 3- The jumping time must be reduced to increase speed and accuracy of shooting.

1- Definition of research:

1.1 Introduction and importance of research:

Societies are advancing by the progress of their scientists and their various innovations that promote production in various fields, including industrial, commercial, educational, economic and even sports.

They provide appropriate scientific researches to address the problems facing this progress, as well as the evolutionary and innovative researches that are working to provide what is new.

We are on the sports side, the scientific researches provided and the various sciences including physiology, medical, social, psychological, kinetic, mechanical and training are all working to raise the level of sports properly with the least effort and cost.

These researches are breaking the rule of stopping progress in achieving athletic achievements by providing the trainer with the right scientific facts by putting the appropriate exercises.

This is why biomechanics is one of the most important sport sciences in the sport achievements. It provides exact scientific facts about the sport movement and its importance in the game in order to do with the least effort and in a right scientific path.

In the game of basketball, the player needs different movements such as jumping and moving fast, especially during the shooting, so you have to study the movements required in the performance of shooting correctly.

From here comes the importance of research in providing scientific facts about the relationship of vertical jump and its role in achieving the successful shooting from far distances, especially shooting of three points as this is considered the most important shot because they score points and is considered the interval in winning and losing the game.

1-2 Research Problems:

The player leads the vertical jump during the far shooting of three points. This requires jumping must be in the right form and according to the appropriate mechanical foundations. The failure to identify those variables and know the extent of their relationship with this type of shooting will lose the most important skill in the game of basketball.

And through the modest experience of the researcher being a specialist in the game of basketball and Biomechanics. He noted the lack of studies to analyze the vertical jump during the far shooting of three points, which considers the need to study and knowing the relationship of the variables of jump shot and success of skill.

1-3 Research Objectives:

- 1- Know the kinematic analysis of the vertical jump and the speed and accuracy of the far shooting of three points for the Play maker advanced basketball.
- 2- Know the relationship between vertical jump and the speed and accuracy of far shooting of three points for the Play maker advanced basketball.

1-4 the imposition of research:

There is a significant correlation between the vertical jump and the speed and accuracy of the far shooting of three points for the Play maker advanced basketball.

1-5 Research Fields:

1.5.1 Human Field: Players of the Distributor Center at Al Minaa Sports Club in 2019

1-5-2 Place Field: Al Minaa Sports Club court.

1-5-3 Time Field: The period from 20/2/2019 to 10/4/2019

2.1 Research community and sample:

The research community was determined by the players of Al Minaa Sports Club for the season (2018-2019) their number (20) advanced player.

Five players are chosen as Play maker (distributor). The proportion of players was 25% of the original community. The sample is homogeneous with the research variables, as in Table (1).

Table (1)

Shows the homogeneity of the sample with the search variables

Variables	Arithmetic mean	Standard deviation	variation coefficient
Age / Year	21.369	1.332	6.233
Length / cm	180.561	3.554	1.968
Mass / kg	81.669	2.748	3.364
Scoring with three points / point	8.64	1.264	14.629
Leg length / cm	105.33	2.564	2.434
Arm length / cm	75.441	2.667	3.535

2.2 Devices and tools used:

- ❖ Video camera number (2) type (Sony HDR - XR 520) with a speed of 115 frames / sec.
- ❖ Laptop (dell) CORE i5.
- ❖ Drawing scale (1 m).
- ❖ tape measure length (15 m).
- ❖ basketball court with balls legal basket type Multan number (3).
- ❖ adhesive tapes.
- ❖ Recording panel.
- ❖ Tripod stand (2)

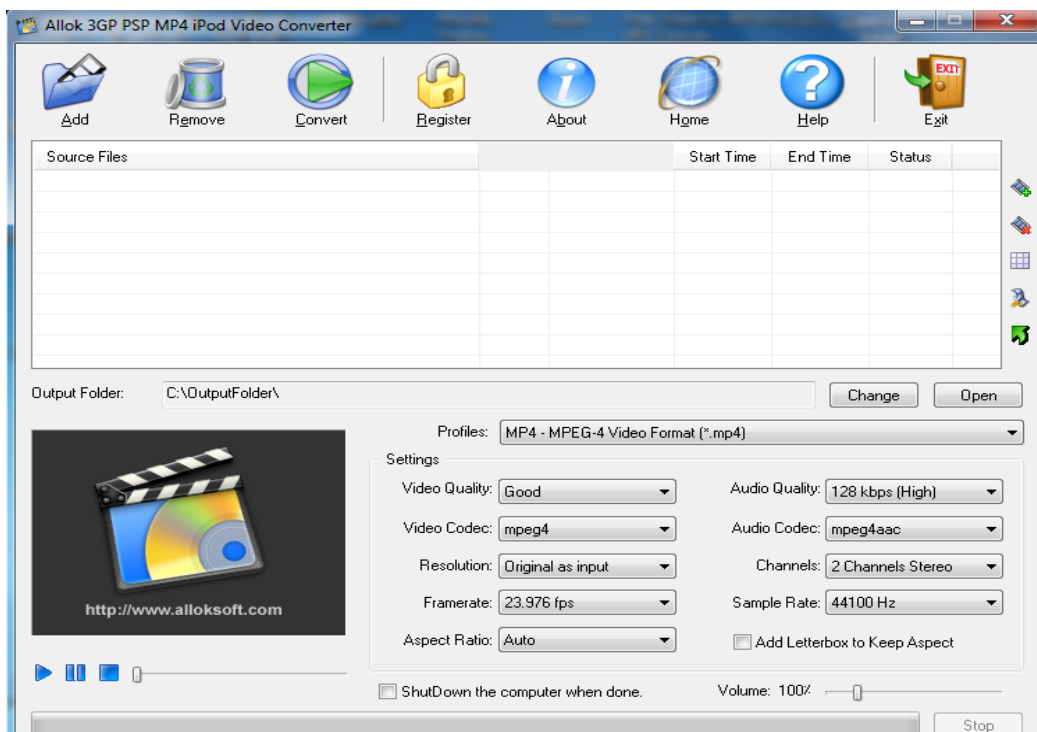
2.3 Video filming:

The researcher used two cameras (Sony HDR-XR 520) with a fast frequency. A camera is calibrated in each analysis because it is not specialized. There is a change in the speed of the recording according to location and lighting. The speed was (115 frames / sec). The first camera was placed at a distance of (7,50 m) from the field of movement of the player at a height of (1,40 m) measured from the ground to the focus of the lens of the camera on the right side of the player where it ensures the identification of the variables of the player. The second camera is placed at a distance of (6,00 m) from the field of movement of the ball and at a height of (1,50 m) measured from the ground up to the focus of the lens of the camera where it ensures tracking of the ball variables until entering the basket. The drawing scale (1 m) was used for both cameras, as in the following figure

2.3.1 Computer Analysis:

The researcher conducted the computer analysis by the following steps:

- 1 - The researcher converted the images stored in the memory of the camera (HOR - XR 520 Sony) to CD disks to facilitate the process of dynamic analysis.
2. The clips were converted from mts to AVI using the Allok3GP PSP (iPod Video Converter) program because the analysis program is not compatible with the extension (mts) and Figure (1) shows the interface of the program.
- 3 - The researcher identified the sections to be analyzed for each member of the research sample and at each center.
4. Transfer the selected sections to the Dart Fish program on the CORE-i5 laptop.



Figure(1)

2.4 Field research procedures:

2.4.1 Determining the Research Variables:

The researcher relied on the sources and references and his personal experience in determining the search variables:

1. Vertical distance (cm)
- 2- Jump time (sec.)
- 3- Jump speed (cm / sec.)
4. Speed of scoring (m / sec.)
- 5- Score accuracy / degree

2.4.2 Exploration Experiment:

The researcher conducted a survey experiment on 20/2/2019 on a sample of the team of the University of Basra (3) distributed players in order to find out the difficulties faced by the researcher, and locate the cameras and the requirements of conducting the main experiment.

2.4.3 Test shooting with jumping after the performance of the dribble (2: 233)

The aim of the test: Evaluate the skill of shooting accuracy with jump (Jump Shot) after the performance of the dribble.

Devices and tools used: Basketball - basket goal

Performance Method: The player performs the dribble from the middle of the pitch towards the goal. When he reaches the free throw line he jumps and shoots, he can score from the following areas:

- 1- The middle of the free throw line.
- 2 - The point of convergence of the free throw line with a three-point arch.
- 3 - from the arch of three points. (A place chosen by the researchers, from the forward area to suit the study objective).
- 4 - The shot will be from the above points from the right, middle and left sides.

Test Conditions:

- 1 - (10) attempts granted to the player for each region.
- 2 - Do not count the attempt that does not come from jumping.
3. The attempt by the player to make a legal mistake is not counted.

Scoring:

1. A single point is awarded to the player for each successful scoring case.
2. The highest points that can be collected by the player are (10) points for each of the scoring areas.

2.5 Main experience:

The main experiment was carried out on 10/4/2019 on the original research sample after warm-up. The far shooting test was conducted according to the test conditions. At the same time filming was done to find research variables.

2.6 Statistical Methods:

The (spss) system was used to find:

- Arithmetic mean
- Standard deviation
- Coefficient of variation
- Simple correlation coefficient (Pearson)

3. Display ,Analysisand discussion of results:

3.1 Display the results of the variables under study and analyze them through the arithmetic means and the standard deviations.

Table (2)

Shows the arithmetic means and the standard deviations of the research variables

sequence	Variables	measuring unit	arithmetic mean	standard deviation
1	Vertical distance	cm	48.965	2.364
2	Jump time	second	0.2567	0.014
3	Jump speed	Cm / second	145.261	18.425
4	Speed shooting	M / second	23.43	0.452
5	Accuracy shooting	Degree	8.64	1.264

3.2 Displaythe correlation results and their analysis between biomechanical variables with speed and accuracy of shooting.

Table (3)

Shows the correlative relationship between biomechanical variables with speed and accuracy of shooting

sequence	correlative relationship	Speed shooting(m / second)	Accuracy shooting(degree)
1	Vertical distance / cm	* 0.886	* 0.889
2	Jump time / second	* 0.912-	* 0.897
3	Jump speed (cm/ sec)	0.354	0.224

* Significant atthe table value of(R) is (0.878),under the degree of freedom (5-2 = 3), and the possibility of error (0.05)

3.3 Discussion of results:

Tables (2) and (3) show that there are no big differences in the level of the sample in the arithmetic means and the standard deviations in the variables under study, but there are some measurements are not the level of ambition, which affected the speed and accuracy of shooting.

We find there are correlations between velocity and accuracy of shooting with vertical distance. The relationship shows significant correlation as vertical distance gives speed in shooting, when the vertical distance increased, the shooting accuracy increased to the player's arrival to an appropriate point with the level of shaving the basketball.

This distance depends on the length of the last jump that has an impact on vertical height. Hussein and others said "The speed increases by increasing the length of the step with time constant and vice versa" (3: 64).

In terms of jumping time with scoring speed, there was a negative relationship as time decreased and speed increased in shooting, this leads to increased accuracy.

As to the speed of the jump when it increases, the shooting speed decreases because of the player's confusion during the shooting and affects the accuracy of the shooting.

4. Conclusions

4.1 Conclusions:

- 1 - The level of the results of the research sample does not raise to the level of ambition in the Kinematics variables under study, which affect the speed and accuracy of shooting.
- 2 - Vertical jump and increase the vertical distance has a role in achieving the speed and accuracy of shooting.
- 3- The jumping time must be reduced to increase the speed and accuracy of the shooting.
- 4 - Lack of interest in the speed of jumping has an impact on the results of speed and accuracy in shooting.

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