An analytical study comparing the results of the ball's speed after being kicked to the farthest distance from different kinetic positions in football

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Abstract: Good and successful performance of the skill requires the verification of mechanical conditions to kick the ball in the right place and the right time for the correct application of the vector during the kicking process, and information about some biochemical variables when performing the ball kicking skill and if available, however there is some information not available, including the application of vectors at Kicking the ball as well as the optimal shape in that application, as the result of the ball's speed in theory in the application of the vectors is when the ball moves in the same direction as the player's movement but it is not applied in practice that makes us doubt the results of that matter, and this is what prompted the researchers To study this case in order to find out the facts from a practical point of view, the study aimed to identify the values of the outcome of the speed of the ball as well as the differences when kicked to the farthest distance from different kinematic positions for the direction of the movement of the ball and the state of the fixed ball.A descriptive approach has been used to solve a problem, while a sample

The research was chosen in the intentional way, and they are (5) players from Al-Mina Sports Club football in Basra Governorate, and the researchers reached several results that have been analyzed and discussed, and from these Results, that the speed of the rolling ball rolling from the front at the second height of the ramp achieved the highest value among the rest of the kinematic positions, as well as the speed of the rolling ball rolling from the back at the second height of the ramp achieved the lowest value between the rest of the kinematic positions, in addition to a significant difference between the speed of the rolling ball From the front at the second height of the slope and both the speed of the fixed ball launch and the speed of the rolling ball from the front at the first height of the slope and the difference was in favor of the first position, in addition to a significant difference between the speed of the rolling ball rolling from the back at the second height of the slope and both the speed of the fixed ball launch The speed of the rolling ball rolling from the front at the second height of the slope, the speed of the rolling ball rolling from the back at the first height of the slope and in favor of the last three positions.

Keywords: Analytical study, speed, and kinetic

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Introduction

Working in the field of sports is one of the most important tasks through which the level of society can be raised, and going into everything that surrounds the sports movement and the various multi-skill games is necessary in achieving achievement and upgrading in the sports level, where the diversity in the conditions and situations of kicking the ball and how difficult it is The conditions and situations in which this skill is performed presently and concretely, and this particular skill occupies a lot of interest among experts and specialists in the field of mathematical biomechanics, who seek to analyze and interpret all the kinetic situations and states of performing this skill, as this science is not limited to abstract description For movement, it goes further, which is qualitative and quantitative skill analysis for the purpose of increasing the efficiency of players during performance, and if the skill of kicking the ball is extremely important from a mechanical point of view.

The good and successful performance of the skill Requires the fulfillment of mechanical conditions to kick the ball in the right place and at the right time for the correct application of the directional force during the kicking process,[1] as it takes into account a lot of destiny Physical and biochemical variables to achieve the desired goal, which is the ideal performance, and information about some biochemical variables when performing the skill of kicking the ball. If available, however, there is some information that is not available, including the application of vectors when kicking the ball as well as the optimal form in that application, as the result of the ball's speed in theory in the application of the vectors is when the ball moves in the same direction as the player's movement. However, in practice, it was not applied to the ground, which makes us in doubt about the results of that matter. the operation .[2] **Objectives of the study**

1. Identify the values of the ball's speed when kicked to the farthest distance from different kinematic positions for the direction of the ball's movement and the state of the fixed ball.
2. Identify the differences in the outcome of the ball's speed when it is kicked to the farthest distance from different kinematic positions of the direction of the ball's movement and the state of the fixed ball. **Study methodology and field procedures**

Research Methodology

The researchers used the descriptive method in the survey method, as it is the best approach to solve the research problem.

The research samples

The research sample was chosen intentionally by Al-Mina Club football players in Basra Governorate, and they (5) who can kick the ball well and with different movement positions, after following some matches and to inquire by the coach about these players.

The means, devices, and tools used

- Arab and foreign sources.
- Sony video camera.
- Tripod.
- HP Core i7 laptop with accessories.
- Specialized software in kinetic analysis.
- Scale drawing length (1 m).

The means used

A method was designed to roll the ball over it from a certain distance so that the ball gained a certain speed of different heights and the speed of the ball rolling from the medium was at the first height (3.22 M/S). The second height (4.62 M/Sec.) and the length of the platform were (2 M)), And Figure 1 shows the method used.

Figure 1. Explains the method used

Pilot study

The pilot study was conducted on 10/20/2019 to use the method that was designed to move the balls and make sure of the ability of the players to kick the ball that rolls from the means and make sure the speed of the ball at every height of the means if the experiment was photographed and analyze the speed of the ball in each height, As well as knowing the distance from which the camera will be placed.

The main experience

The main experiment was conducted on 10/27/2019. The main experiment was applied to the research sample members and one of the training fields for the Sports City in Basra.

Video photography

A Sony video camera did filming with a frequency speed (25 images/second) placed on a tripod at a distance (7.5 m) and a height of (1.5 m) perpendicular to the field of movement. These distances provided a good field in front of the player to measure the outcome of the ball's speed after it was launched.

Computer analysis

Computer analysis was carried out with the following steps:

1. I converted the video material from Video Type to the files format using the conversion card (striking) and then to the CDs to facilitate the analysis steps.
2. The movement was cut by (video cutter) program into pictures to extract the specified variables and store these clips in the form of files stored in the laptop file folder (My Document).
3. These files (clips) were then transferred to the program (dartfish) installed on the laptop, a program dedicated to analyzing mathematical movements.

Statistical means

Researchers used the SPSS (23) Statistical Package to process data and extract results.

Results and discussions

Table 1. Shows the value of the mean and the standard deviation of the velocity of the starting ball after being kicked from different kinematic positions

S	Variables	Mean	SD
1	Fixed ball starting speed (m / s)	13.77	9.1
2	Rolling speed of the rolling ball from the front at the first height of the ramp (m / s)	13.41	2.09
3	Rolling speed of the rolling ball from the front at the second slope height (m / s)	15.76	0.55
4	Rolling speed of the rolling ball from the back at the first slope height (m / s)	15.16	1.21
5	Rolling speed of the rolling ball from the rear at the second slope height (m / s)	11.72	1.77

Table 2. Show the values of the analysis shows the variance between the variables

Groups	Sum of squares	N	Average squares	F	Type of significance
Between groups	50.14	4	12.53	4.83	0.007
Within groups	51.86	20	2.59		
Total	102	24			

Through the results shown in Table (2), the researchers noted that the calculated value of (F) was (4.83), which indicates the presence of significant differences between the speed of the football start while kicking it to the farthest distance from different kinetic positions.

Table 3. Shows the difference between the mean and the value of L. S. D of the variables in question

S	Variables	1	2	3	4	5
1	Fixed ball starting speed (m / s)	-	0.362	- 1.987*	-1.383	2.053*
2	Rolling speed of the rolling ball from the front at the first height of the ramp (m / s)		-	- 2.35*	-1.746	1.69
3	Rolling speed of the rolling ball from the front at the second slope height (m / s)			-	0.604	4.04*
4	Rolling speed of the rolling ball from the back at the first slope height (m / s)				-	3.436*
5	Rolling speed of the rolling ball from the rear at the second slope height (m / s)					-

* The value of L. S. D = 1.753.

From the results shown in Table (3), it became clear that there is a significant difference of -1.987 between the starting velocity of the fixed ball and the speed of the rolling ball from the front at the second height of the slope and in favor of the latter.From the preceding, the researchers believe that the speed of the rolling ball rolling from the front at the second height of the slope has outperformed the speed of the stationary ball starting, as the researchers attribute the reason for this to the fact that the fast and rolling ball from the front possesses kinetic energy towards the player and that this kinetic energy will have two effects on the speed Starting the ball after being kicked by the player, the first effect comes through the rebound of the ball after collision with the player's foot,[3] which increases its effectiveness, the rubber of the ball. This rebound is an additional vector force towards the starting ball after the kick. The second positive effect is that the ball rolling from the front towards The player works to increase the resistance factor on the man's kicked muscles, which leads to the stimulation of a greater number of muscle fibers during the kicking of the

ball.[4] "The muscle strength increases as the nerve signal coming to it increases, and it works to involve the largest number of muscle fibers in work, that is, the resulting muscle strength increases in addition to the psychological factor" .[5]

Through the results shown in Table (3), it became clear that there is a significant difference of (-2.35) between the speed of the rolling ball from the front at the first height of the slope and the speed of the rolling ball from the front at the second height of the slope and in favor of the last. From the preceding, the researchers see that the ball rolling from the front at the first height of the slope came somewhat slow, especially when approaching the player, which makes it therefore in a state closer to the fixed ball, in addition to that the ball, in this case, loses the amount of movement that qualifies it for effective collision with the player's foot Not to mention, the moving ball is slowly affected by the pitch of the field in a way that makes it unstable as it approaches the player, which creates difficulty in timing when kicked by the player. In the case of a rolling ball from the second height of the slope, it was the highest speed and the highest value for the amount of movement, which increases the impact of the collision with the player's foot when kicked, in addition to the stability of the approach to the player, which leads to the ease of carrying out the process of kicking the ball by the player and enables him to make more power, resulting in faster ball launch.[6]

Through the results shown in Table (3), it became clear that there is a significant difference of (2.053) between the speed of the ball going from stability and the speed of the ball rolling from the back at the second height of the slope and in favor of the first. From the preceding, the researchers see that the rolling ball from the back at the second height of the slope is a fast-rolling ball in the same direction as kicking the ball; from the physical point of view, this is an ideal case for the ball to start at high speed after kicking it according to the law of gathering vectors with a single result, which was mentioned by both, "If an object goes under the influence of two speeds at the same time, then the outcome of the two speeds depends on their direction. If the two speeds are in one direction, then the sum of the speed is their geometry." [7] But in practice, we find that these are the weakest cases. For the speed of the launching ball, which reached its mean (11.72 M/S), this weakness is explained by the researcher that the ball rolling from the back quickly makes it difficult for the player to shed the power of kicking on them because there is not enough time to collide between his foot and the ball, in addition to that the player stops Partially when kicking the ball. This stopping does not include the ball, but rather, it continues towards the front, which makes it difficult to kick it at the right time or the right place, leading to a decrease in its starting speed values. Still, in the case of the fixed ball, the player takes Sufficient time to perform the kick and choose the appropriate approaching way, knowing that the value of the ball's amount of movement, in this case, is zero.[8]

Through the results shown in Table (3), it became clear that there was a significant difference of (4.04) between the speed of the rolling ball rolling from the front at the second height of the slope and the speed of the rolling ball rolling from the back at the second height of the slope and in favor of the first. From the preceding, the researchers believe that the reason for this difference is due to the speed of the rolling ball rolling from the front at the second height of the slope has achieved the highest values of the speed of the rolling ball rolling from the back at the second height of

the slope. The lowest value between the speed of the ball rolling, whose reasons have also been mentioned, and this is what led To the emergence of this moral difference between the two variables.[9]

Through the results shown in Table (3), it became clear that there is a significant difference of (3.436) between the speed of the rolling ball rolling from the back at the first height of the slope and the speed of the rolling ball rolling from the back at the second height of the slope and in favor of the first. From the preceding, the researchers believe that the ball in the first case is less fast, making it easier for the player to control the performance of kicking the ball properly, as the ball is at the moment of kicking it closer to the fixed ball. In contrast, in the second case, the high speed of the rolling ball is a limiting factor for the player when the kick is executed In a way that reduces the effectiveness of the performance, in addition to what we have mentioned above about the mechanical aspects related to the performance of such kicks and this is what caused the moral difference between the values of the speed of the ball's launch after being kicked in both cases.[10]

Conclusions

1. The rolling speed of the rolling ball from the front at the second height of the slope achieved the highest value among the remaining positions.
2. The speed of the rolling ball rolling from the rear at the second height of the slope achieved the lowest value among the rest of the positions.
3. There was a significant difference between the rolling ball's speed rolling from the front at the second height of the ramp and both the speed of the ball rolling steady and the speed of the rolling ball from the front at the first height of the ramp. The difference was in favor of the first position.
4. There is a significant difference between the speed of the rolling ball rolling from the back at the second height of the slope and both the speed of the ball rolling steady and the speed of the rolling ball from the front at the second height of the slope and the speed of the rolling ball rolling from the back at the first height of the slope and in favor of the last three positions.

References

1. Essam Abdel-Khalek: Mathematical Training (Theories - Applications), Egypt, 2nd edition, Dar Al-Fikr AlArabi for Printing and Publishing, 1999. P. 121.
2. Qasim Hassan and Iman Shaker: Principles of the mechanical foundations of mathematical movements, Amman, Edit1, Dar Al Fikr for printing and publishing, 1998, p. 19.
3. Savelsbergh, G . and Bootsman, R . Perception-Action Coupling in Hitting and catching. In International Journal of sport psychology, No. 25, 1994.
4. Kazem al-Rubaie: the entrance of the modern tactic in football, Jafar Press self-made, Baghdad 2015.

5. Mohammed Abu-eyed, Mufti Ibrahim: planning the preparation of football players programs, Dar Arab Thought, Cairo, 1985.
6. Conciliator glorious Lord: German thought training, sources of football training German football federation 2007.
7. Wadih al-Tikriti Yassin, Hassan Obeidi: statistical applications and computer use in physical education research, Mosul University Press 1999.
8. Eshraq Ali Mahmoud: Performance tests of several physical and skill variables and their relationship to basketball teams' results: 2002: Master's Thesis, Faculty of Physical Education, University of Baghdad.
9. Fleisig, G. S., Escamilla, R. F., Andrews, J. R., Matsuo, T., Satterwhite, Y., & Barrentine, S. W. (1996). Kinematic and kinetic comparison between baseball pitching and football passing. Journal of Applied Biomechanics, 12(2), 207-224.
10. Athab, N. A. (2019). An Analytical Study of Cervical Spine Pain According to the Mechanical Indicators of the Administrative Work Staff. Indian Journal of Public Health Research & Development, 10(5), 1348-1354.