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A Comparative Study of the Pressure of the Pivot Foot for Direct Free Kicks in Football and For Different Areas

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1- Introducing the Research

1-1. Research Introduction and Significance

Upgrading the level of sports in various sports activities depends on the completion of the training status of the player, which in turn depends on the physical, skill, planning, mental, psychological and social aspects. The increasing world, being one of the most popular games in the world, which made specialists always seek to develop the game, as it has witnessed an increasing development in recent years and on a wide international scale in the physical, skill, tactical and psychological aspects. These aspects are linked to overlapping relationships. As the technical aspects are one of the main pillars in this game, and through its mastery, the level of performance improves for the purpose of communicating scientific facts.

The skill of scoring in football is one of the offensive motor skills and it is the basis and pillar of the offensive technique in the game and all good offensive movements that end with scoring against the opposing team's goal, and scoring is the basic principle that we must pay more attention to than other basic skills. And kinetic analysis in football is the real guide to performance that seeks to study the parts of the movement and its components to reach its minutes in pursuit of better technical performance, as it is one of the means of accurate knowledge of the path with the aim of improvement and development. evaluated in light of the specific considerations of performance specifications. From this point of view, stakeholders, trainers and specialists in this game must study, evaluate and analyze this skill, and the analysis is one of the assistive means that helps coaches to know the players' levels and diagnose their strengths and weaknesses, which may help in correcting their mistakes and avoiding them in the future and then obtaining better results from Several studies carried out by (Mohammed Abdo, Mufti Ibrahim) on the World Cup matches, it became clear to them that a percentage ranging between 45% - 50% of the goals are scored from fixed positions. Through this study, the researcher tries to use the latest equipment, including one

(3Dynafoot), which has the ability to provide information on the pressures it exerts on the fulcrum areas in fixed cases, hence the importance of the research in developing numerical values for football players in the Middle Euphrates clubs participating in the Iraqi Elite League for the season

2020-2021 and used in developing training programs to improve Performance with direct free kicks in football.

1-2. Research Problem

Fixed kicks, including direct free kicks, are among the kicks that have become important in achieving victory and deciding the outcome of the match, especially from the places facing the goal and close to the penalty area line and parallel to the goal line. And since the researcher is a former player and has represented clubs and age groups in the city of Diwaniyah, as well as dealing with football teams as an employee in the Ministry of Youth and Sports, the researcher decided to delve into this study to find quantitative data about the pivot foot through the different pressure areas in the foot while executing direct free kicks so that coaches can Putting exercises and curricula properly in direct kicks exercises. Therefore, the researcher will answer the following question:

Question: Is there a difference in the areas of pressure applied to the pivot foot and from different areas of direct free kicks in football?

3-1. Research Objective

The research aims to: -

1- Recognizing the quantitative values of the pressure areas on the pivot foot for direct free kicks from different areas for the players of the Middle Euphrates clubs participating in the Iraqi Elite League.
2- Identifying the differences between the pressure areas on the pivot foot in direct free kicks according to the four accuracy areas and from different areas for the players of the Middle Euphrates clubs participating in the Iraqi Elite League.
3- Recognizing the differences in the pressure applied to the pivot foot for direct free kicks between the different regions of the players of the Middle Euphrates clubs participating in the Iraqi Elite League.

2. Research hypotheses:

The researcher assumes that there are

1- Value differences between the pressure areas on the pivot foot in direct free kicks from different areas for the players of the Iraqi Elite League for the middle Euphrates clubs.
2- Value differences in the pressure applied to the pivot foot for direct free kicks between the different regions of the Iraqi Elite League players for the middle Euphrates clubs.

1-5. Research Scope

The human field: a sample of the players of the middle Euphrates clubs in the Iraqi Elite League.

- Time range: from 12/30/2020 to 6/23/2021 CE.
- Spatial domain: The stadium of the College of Physical Education and Sports Sciences - University of Al-Qadisiyah.

2. Research Methodology and Field Procedures:

2-1- Research Methodology:

The researcher used the descriptive approach in the style of comparative studies for its suitability in achieving the objectives

2-2- The Research Community and Its Sample:

The researcher identified his research community with players specialized in the implementation of direct free kicks for the middle Euphrates clubs participating in the Iraqi Elite League for the season 2020/2021.

2-3. Means of data collection:

2-3.1. Research tools: Scientific sources and references (Arabic and foreign).

- Scientific sources and references (Arabic and foreign).
- Measurements and tests used in the research.
- International Information Network (Internet).
- Observation and experimentation.
- Assistant Team.

2-3-2. Equipment and tools used in the research

- The football fields.
- Footballs (20) type (Official).
- Iron wall in the form of a single player. Number (5). With a height of (198) cm, the average length of the players with the height of the player's heels off the ground, and the width of (50) cm, the width of the chest with arms .
- tape measure.
- Computer (Sony Vaio) Pentium 4, which was used for the purpose of statistical analysis and processing.
- Stop watch to calculate the time.
- Tapes (ropes) to divide the target.
- Electric generator.
- French-made (3 Dynafoot) system device.

2-4 Field research procedures.

2-4-1 Determine the Studied Variables.

The researcher determined the variable of pressure imposed in consultation with the supervisor and the committee approving the subject of the thesis (*) in the performance of direct free kicks for elite club players (the Middle Euphrates).

2-5 Dynafoot 3

A foot device is a practical solution for the dynamic analysis of the pressures that occur in the areas of the foot and strength. This device is placed in the sports shoe by means of a bearing under the foot, and receives information through sensors inside the device and copies an image of the entire foot and stores it in the memory in the device and displays it on the computer after the athlete performs effortlessly.

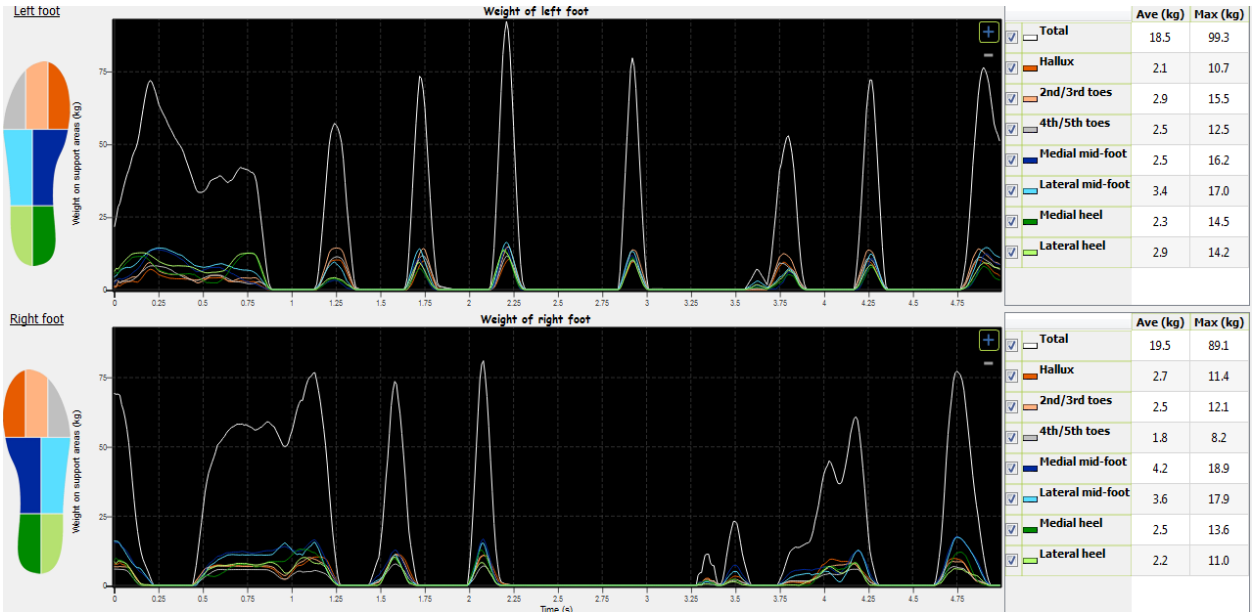


Figure (1) Divisions of The Foot and The Applied Pressure

2-6. Test Name: Scoring Accuracy with the Inside of The Foot

The objective of the test: to measure the accuracy of scoring with the inside of the foot and to extract the biomechanical variables from different areas (the central area, the right side, the left side) and in the presence of a wall.

- Tools used: soccer field, soccer balls (20), tape to set the scoring area for the test, tape measure, wall. White powder to determine the scoring distance.
- Test Instructions:

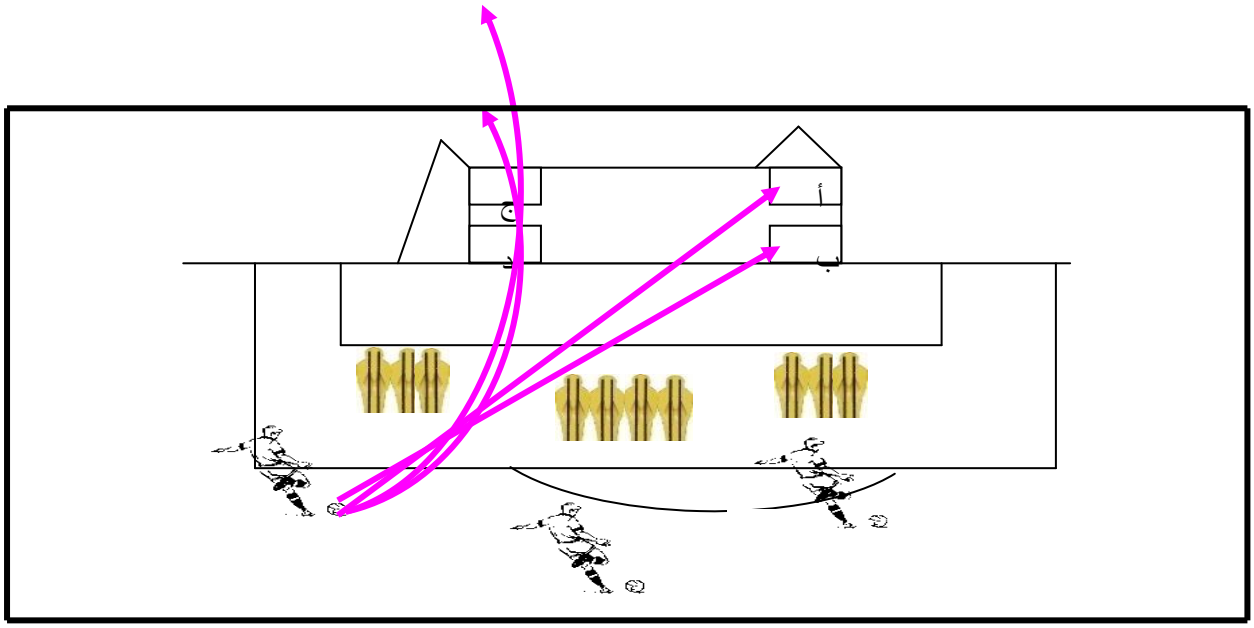
The laboratory stands in the scoring area and from the three scoring areas on one side (right, middle, and left).

- Where to place the wall, which is the legal distance of 10 yards from the ball and in the three areas.
- The number of the wall in the central area is (4-5) players and on the right and left sides (3-4) players.
- One experimental attempt can be given to the laboratory, the results of which are not counted.
- The player scores on one area of accuracy, then the other player, and so on.

- Each lab shall give (12) attempts for long-distance scoring from the central area, (3) attempts in each of the four areas of accuracy.
- Each lab shall give (12) attempts to score far from the right side (3) attempts in each of the four scoring areas.
- Each lab shall give (12) attempts for long-distance scoring from the left (3) attempts in each of the four areas of accuracy.

2-7. Performance Method:

The ball is installed in the place designated for it, and the tester kicks the ball with the face of the foot from the inside on each of the four accuracy areas in the goal and according to the sequence where the goal was divided into four areas, two areas of accuracy on the left side of the goalkeeper and named upper (A) and lower (B).) and two areas of accuracy on the right side of the goalkeeper, called the upper (C) and the lower (D) for the player who kicks the ball with the right foot.) on the left side of the goalkeeper, as shown in Figure (2).



- Registration:
- The researcher does not mean the result of accuracy.

Figure (2)

Explains The Method of Testing the Accuracy of Scoring from Direct Free Kicks (Right Side, Center Side, Left Side)

2-8. The exploratory experience:

For the purpose of determining the accuracy and validity of the work of the research tests and to avoid the obstacles that may appear when conducting the main experiment, knowing the extent of its efficiency, and standing up to the work of the devices used and testing them. The researcher, with the help of an assistant work team, conducted the exploratory experiment on a group of (4) Iraqi Elite League players, on Monday, 10/1/2021, at exactly ten thirty in the morning, and at the Qadisiyah University stadium, and the experiment showed the following:

1. The suitability of the devices and tools used in the tests.
2. Ensure that the Dynafoot 3 system is working.
3. Extent of readiness of the testers to conduct the test.
4. Identifying and avoiding errors that occur during the implementation of the main experiment.
5. The adequacy of the assistant work team in performing their task during the tests.
6. Knowing the time taken to take the test and implement it.

The difficulties that the researcher faced while conducting the exploratory experiment, which are:

1- The health situation and the difficulty of moving between governorates
2- The difficulty of collecting the sample members on time due to their association with the matches of their teams in the elite league
3- A shortage of some of the dynavut system tools (batteries) due to the device not being charged, and therefore new batteries were purchased.
4- How to install the device on the player's feet.

2-9. Main Experiment

The main experiment was conducted on the research sample on Saturday, February 6, 2021 at exactly 11 am, in the stadium of the College of Physical Education and Sports Sciences at the University of Al-Qadisiyah. It was conducted on (15) players, as the sample was tested for the accuracy of the performance of direct free kicks in Football from different regions, and the researcher used the Dynafoot 3 system) to extract the kinetic variables. The researcher was keen to synchronize the Dynafoot 3 system during the experiment.

2-10. Statistical Means

The obtained data were processed using a number of statistical methods that are compatible with the objectives of the study to reach knowledge of the results through the use of the statistical package (SPSS), through which the following was obtained:

1-4. Presentation and analysis of the results of the differences in the pressure applied to the pivot foot for direct free kicks for the research sample.

1-1-4. Presentation and analysis of the results of the differences in the pressure applied to the pivot foot for direct free kicks for the research sample for the highest pressure at the moment of scoring:

Directions	Accuracy Areas	Scale Unit	Mean	Std. Dev.	Sample No.
Area A	g/cm2	g/cm2	620.600	32.533	15
Area B	g/cm2	g/cm2	631.133	25.303	15
Area C	g/cm2	g/cm2	617.400	21.689	15
Area	g/cm2	g/cm2	601.20	34.082	15

D			0		
Total	g/cm2	g/cm2	617.583	30.126	60
Area A	g/cm2	g/cm2	616.600	32.533	15
Area B	g/cm2	g/cm2	661.733	26.853	15
Area C	g/cm2	g/cm2	625.200	26.336	15
Area D	g/cm2	g/cm2	640.400	21.689	15
Total	g/cm2	g/cm2	635.983	31.576	60
Area A	g/cm2	g/cm2	629.133	48.541	15
Area B	g/cm2	g/cm2	625.000	38.730	15
Area C	g/cm2	g/cm2	612.333	20.656	15
Area D	g/cm2	g/cm2	608.000	23.238	15
Total	g/cm2	g/cm2	618.617	34.951	60

Table (1) shows the statistical characterization of the pivot foot pressure variable for direct free kicks and from different regions (left side, middle side, right side) for the search sample for the highest pressure and from the four accuracy areas (accuracy area A, accuracy area B, accuracy area C, area Accuracy d) to the goal.

Table (2) shows the results of the binary variance analysis of the variable pressure applied according to the four precision regions and from different sides and the interaction between them are shown:

Variance Source	Squares Total	Freedom Degree	Squares Means	F-Percentage	Sig.
Directions	12824.578	2.000	6412.289	6.934	0.001
Accuracy Areas	14643.794	3.000	4881.265	5.278	0.002
Directions x Accuracy Areas	14445.022	6.000	2407.504	2.603	0.019
Error	155358933.	168.000	924.756		
Total	70298681.000	180.000			

It is clear from Table (2) that the variable of the regions is statistically significant, as the calculated t value (6.934) is greater than the t value at the level of (0.001) and with a degree of freedom (2,180).

It appears from the table that there are statistically significant differences for the variable areas of accuracy, where the calculated FV value (5.278) was greater than the tabular FV value at the level of significance (0.002) and the degree of freedom (3, 180). It also appears from the table that there is an interaction between the variables (scoring points and areas of accuracy on the target) in the variable of the highest pressure produced by the pivot foot and the moment of scoring on the goal, as the calculated value of (2.603) was greater than the tabular value at the level of significance (0.019).

Table (3): The results of the least significant difference between the variable of the highest pressure applied to the pivot foot according to the four areas of accuracy and from different sides

Comparison		Means Difference	Standard Error	Sig, Level
Area A	Area B	*-17.178-	6.411	0.008
Area A	Area C	3.800	6.411	0.554
Area A	Area D	5.578	6.411	0.386
Area B	Area C	*20.978	6.411	0.001
Area B	Area D	*22.756	6.411	0.001
Area C	Area D	1.778	6.411	0.782
Left Direction	Middle Side	*-18.400-	5.552	0.001
Left Direction	Right Direction	1.033-	5.552	0.853
Middle Side	Right Direction	*17.367	5.552	0.002

Table (3) shows the results of the least significant difference between the variable of the highest pressure applied to the pivot foot according to the four accuracy areas and from different sides significant differences in most areas of accuracy and scoring destinations in (accuracy area A - and accuracy area B) in favor of (accuracy area B), either In (accuracy B area - accuracy area C) in favor of (accuracy area B - accuracy area D) in favor of (accuracy area B) and according to scoring points (left side - center side) in favor of (middle side) and in (Center side - right side) in favor of (center side).

While there were no significant differences in (accuracy area A - accuracy area C), (accuracy area A - accuracy area d), (accuracy area C - accuracy area d) and for the parties (left side - right side).

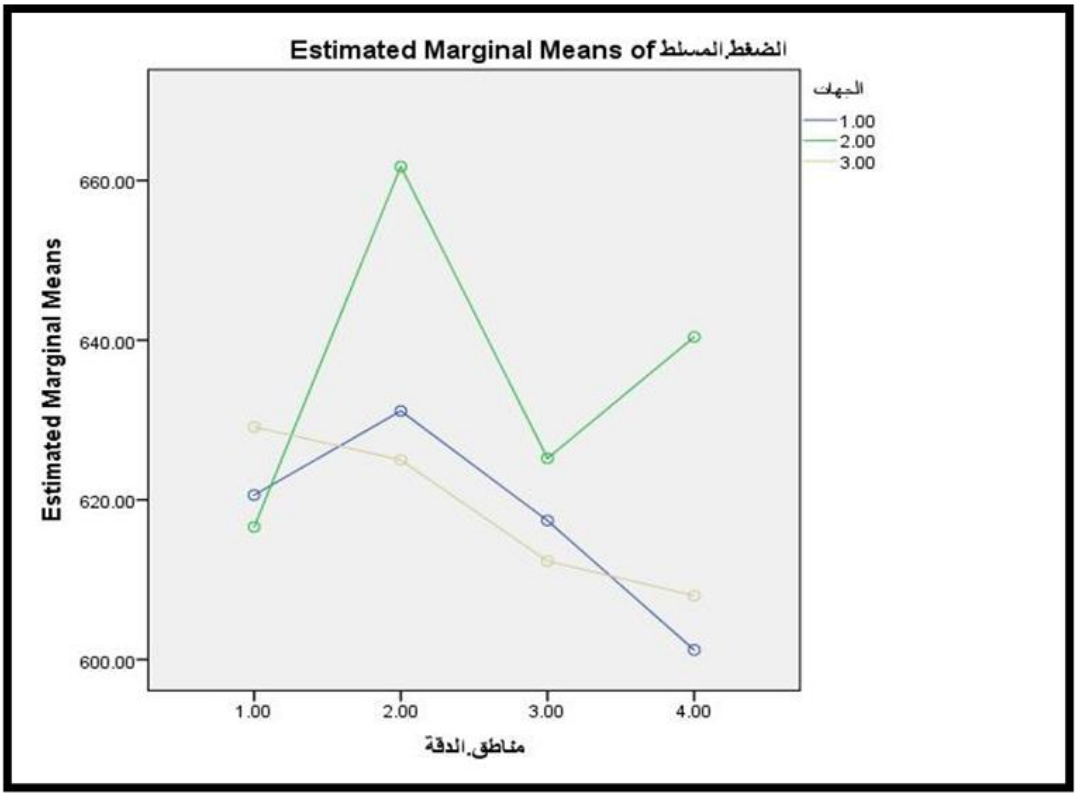


Figure (3) shows the values of the variable of the highest pressure applied to the pivot foot according to the four precision areas and from different sides and the interaction between them.

2-3-3. Discussing the results of the pressure variable for the pivot foot for free kicks with Football:

The tables (23,24,25) related to the maximal pressure variable of the pivot leg for the four scoring accuracy areas as well as between the three areas (right, middle and left) by observing the values of the arithmetic means, test (F) and mean difference (LSD), which showed a significant difference in the variable Maximum pressure applied in the performance of scoring accuracy with direct free kicks from different areas.

The characteristics of the tables showed a difference among themselves in terms of the differences between the pressure variable of the pivot foot according to the celebrated areas and the accuracy of scoring through the use of the Dynafoot 3 device.

There were significant differences between the different areas (right, middle, and left) as well as the four accuracy areas (A, B, C and D), while there were no clear significant differences in the pressure applied between them. There was no significant difference between the scoring area (A and C) and between (A and D) and between (C and D) as well as between the regions did not appear between the two sides (left and right). Whereas, significant differences appeared in the rest of the

regions, and the researcher attributes this to the fact that the pressure applied to the pivot leg is higher according to the mechanical position of the pivot leg and the body's support, which records the maximum state of pressure for the pivot leg as a result of stopping and relying on the pivot foot to gain the kicker man greater momentum at the moment of kicking The ball and this is normal according to the mechanics of the preparatory steps for the implementation of direct free kicks, as "whenever there is a preliminary movement for any skill or sporting movement, the goal of that performance".

The researcher believes that this study has added new values in the field of biomechanics in the performance of direct free kicks according to different areas of implementation as well as areas of scoring accuracy, where the researcher believes that the conversion of energy from one form to another without loss passes in the state of stability for an appropriate period of time while resting on the foot of a man The focus and then directing it, whether in pressure or force, to what suits achieving the mechanical goal, and thus the body gains more momentum during the implementation of direct free kicks. As "the benefit of using kinetic analysis is reflected on the performance of mathematical skills in a sequential and streamlined manner and is compatible with reducing the cases of intermittent performance of movements, which will be positively reflected on the level of performance and the mechanism of use of its elements to serve the performance as well as the knowledge of the coach and athlete of the amounts of qualitative mechanical quantities completed such as the form of performance, performance level, body position. The researcher believes that the role of mechanical laws that limit movement, especially pressure and its components, which is force and area, and since the area is fixed, of course, to measure the pivot foot, the force has the greatest impact on the pressure variable in this study, and that the increase in pressure values to its maximum degree is according to the projection of the largest force applied to the pivot foot According to the player's technique and his appropriate anatomical position in scoring at the required angle and the different playing areas, "the mechanical basis for achieving accuracy lies in how to deal appropriately with the position of the kick and the player's pivot base (the pivot foot) and its relationship to the other parts that have an effective role to perform the kicking skill successfully and effectively."

5. Conclusions and Recommendations

5.1. Conclusions

In light of the results of the research and statistical data analysis through the field experiment that was obtained by the Dynavut device, where the researcher reached:

1- The difference in the anatomical position of the player affected the strength levels of the seven foot areas with the different scoring accuracy areas and the different shooting areas.
1. A significant difference appeared in the medial midsection to give more momentum while shooting.

5.2. Recommendations

1- Conducting more research and studies to emphasize the importance of using modern means as well as kinetic programs to reach objective results in a manner that serves the skill level of the players. The (Dinavout) system for other sports.

2- 2.- There is a lot of kinetic analysis that can be extracted from the dynavut system that can be studied by researchers, so the researcher recommends going into it.

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