



An Analytical Study Using the Player-Maker Device of Some Physical Variables of Midfielders and Attackers of Al-Karkh Football Club Under (19) Years Old

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Abstract

The research aims to identify the values of physical variables and their differences according to the Player-Maker device for the performance of midfielders and attackers in matches of the Iraqi Youth League Under (19) years old. The main experiment was conducted in the Iraqi League on a sample of Al-Karkh Sports Club youth players, including the midfield and attack positions. The researcher used a descriptive approach with a comparative approach. The statistical package (SPSS) was used to extract the results (Mean), (Std-Deviation), and (One-Way ANOVA). The researchers concluded that there were no significant differences in the playing levels of Al-Karkh Club in terms of the value of the physical variables studied. This indicates that playing levels and performance did not improve during matches against Al-Ittihad, Al-Kahraba, Al-Zawraa, Al-Talaba, and Amanat Baghdad clubs. The researchers recommend using the Player-Maker device in futsal to extract other physical variables, and to use the device in many other games, such as basketball, handball, and others, to extract many physical variables.

Keywords: Work rate, distance covered, back turns.

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Introduction

Football is a team sport characterized by high dynamism and a wide range of physical, technical and tactical demands with roles and responsibilities varying from one position to another, which requires players to develop specific abilities suited to their positions on the pitch. Midfielders and forwards are among the players most exposed to physical strain during a match given the nature of their roles which require constant movement, switching positions and participation in both attacking and defensive play (Bangsbo, Mohr, & Krstrup, 2006). Furthermore, the physical demands of football vary considerably between different positions. For example, midfielders are required to cover considerable distances during matches combining aerobic endurance with high-intensity efforts to transition between defense and attack (Bradley et al., 2013). In contrast, forwards rely heavily on explosive acceleration rapid changes of direction and short-distance sprints to outmaneuver defenders and capitalize on scoring opportunities (Buchheit et al., 2010). This requires advanced physical attributes such as speed, aerobic and anaerobic capacity balance coordination and agility alongside the technical skills that help them create and score goals. With the growing interest in the scientific analysis of sporting performance, there has been an increasing need for advanced tools and technologies that provide accurate quantitative data on players' physical and technical performance. Among these tools, the Player-Maker device has emerged as one of the most important modern technologies used to track and analyses players' performance. The device is characterized by its ability to record and analyse accurate and detailed data via sensors attached to sports shoes enabling the tracking of foot movements and the recording of the number of passes distances covered speeds accelerations and precise movement patterns during training or competitions. (Rein & Memmert, 2016).

The device also enables coaches and analysts to produce comprehensive reports on players performance helping them to improve training methods and identify each player's strengths and weaknesses. The analysis of physical variables takes on particular importance among young people, such as those under 19, as this age group marks a pivotal transitional phase between grassroots development and entry into the professional game. Understanding the physical capabilities of players at this stage helps coaches design appropriate training sessions that ensure optimal Improvement of physical performance and reduce the likelihood of injury resulting from unbalanced training loads (Dellal et al., 2010). Furthermore, analysing performance by position helps to tailor training to the specific requirements of each position which contributes to preparing players capable of meeting the demands of modern football characterised by speed and high pressure.



It is against this backdrop that the importance of this study arises it aims to analyse certain physical variables among the midfielders and forwards of Al-Karkh Club's Under-19 team, using the 'Player-Maker' device by monitoring variables that are key indicators in performance assessment such as the number of accelerations and decelerations, distances covered in different areas of the pitch, and the frequency of high-intensity running. The findings of this study are expected to provide a realistic picture of these players' physical performance levels supply the coaching staff with accurate information to help improve training and match planning and support modern trends in the use of digital analysis in the preparation of sports teams.

Method and Tools

The researchers employed a descriptive approach using a comparative method, and the research sample was selected using a purposive sampling method, comprising 6 to 8 players representing the midfield and attack positions for Al-Karkh Sports Club for the 2024–2025 season, depending on the substitutions made in each match; these players constituted 100 per cent of the players in those positions.

The pilot studies

was conducted on Sunday, 1 December 2024, at 5.00 pm with the support team (*) on six players who were purposively selected from the research population.

The main experiment

was then conducted over five matches, running from Saturday 7 December 2024 to Friday 31 January 2025. The device (*) was attached to the players' feet and operated during the matches in order to analyse the players' performance and record physiological variables.

Statistical methods

The SPSS statistical package was used to calculate the mean standard deviation and to perform a one-way ANOVA.

Results

Table1. shows the means, standard deviations and ANOVA results for the physical variables

Descriptives					ANOVA				
variables	Clubs	N	mean	SD	Between groups Within groups	SS	MS	F	Sig.
Playing time (minutes)	Al-Zawraa	7	77.14	23.21	Between	2848.05	712.01	2.199	.095
Distance covered (km)	Al-Ittisalal	6	88.33	4.08					
	Amanat Baghdad	6	90.00	.000	Within	9064.19	323.72		
	Al-Kahrabaa	8	67.50	28.66					
	Al-Talaba	6	90.00	.000	Total	11912.24			
	Total	33	81.52	19.29					
Work rate	Al-Zawraa	7	6.90	2.47	Between	26.97	6.74	1.827	.152
	Al-Ittisalal	6	7.77	1.44					
	Amanat Baghdad	6	8.27	.709	Within	103.32	3.69		
	Al-Kahrabaa	8	5.89	2.58					
	Al-Talaba	6	6.18	1.22	Total	130.29			
	Total	33	6.93	2.02					
(m/min)	Al-Zawraa	7	92.01	7.32	Between	335.00	83.75	1.914	.136
	Al-Ittisalal	6	91.35	4.78					
	Amanat Baghdad	6	95.64	7.30	Within	1225.03	43.75		
	Al-Kahrabaa	8	87.54	7.74					
	Al-Talaba	6	86.72	4.56	Total	1560.03			
	Total	33	90.50	6.98					
Back turns (repetitions)	Al-Zawraa	7	53.00	17.45	Between	2316.47	579.12	2.269	.087
	Al-Ittisalal	6	56.67	14.50					
	Amanat Baghdad	6	49.50	15.11	Within	7147.71	255.28		
	Al-Kahrabaa	8	40.88	19.10					
	Al-Talaba	6	33.00	10.71	Total	9464.18			
	Total	33	46.45	17.20					

DF = 4 + 28 = 32... significant at (Sig) ≤ (0.05).

Table2. shows the LSD (Least Significant Difference) values for the physical research variables

Physical variables / First leg	Clubs	Mean Differences	Sig.	Significance.
Playing time (minutes)	Al-Ittisalal Al-Kahrabaa	20.83*	.041	Al-Ittisalal
	Amanat Baghdad Al-Kahrabaa	22.50*	.028	Amanat Baghdad
	Al-Kahrabaa Al-Talaba	-22.50*	.028	Al-Talaba
Distance covered (km)	Amanat Baghdad Al-Kahrabaa	2.38*	.030	Amanat Baghdad



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Work rate (m/minute)	Al-Kahrabaa	Al-Kahrabaa	8.10*	.031	Amanat Baghdad
	Al-Kahrabaa	Al-Talaba	8.92*	.027	Amanat Baghdad
Turns	Al-Zawraa	Al-Talaba	20.00*	.032	Al-Zawraa
	Al-Ittissalat	Al-Talaba	23.67*	.016	Al-Ittissalat

Significant at (Sig. ≤ 0.05).

Discussion

Table (1) shows that there were no statistically significant differences (ANOVA); however, from our perspective given that this is an analytical study intended to benefit players and coaches we have included all statistics indicating statistically significant differences in certain variables in Table (2) (LSD). It is therefore evident that statistically significant differences for some of the physical research variables were observed in the matches against Al-Ittissalat, Al-Zawra'a, Al-Talaba and Al-Amana; these variables were playing time, distance covered, work rate and turns. The researcher attributes the cause of these differences to the coach's focus on these variables; furthermore numerous other factors, such as the venue of the match, the nature of the competition, the team's ranking, the standard of play, the match result and the style of play may influence individual and team performance (Eccles et al., 2009). With regard to playing time, the figures favoured the matches played against clubs (Telecom, Students and Baghdad Municipality) compared with the match played against Al-Kahraba Club. The researchers attribute this to the fact that in those three matches no players were substituted from the midfield or attack, thereby increasing the playing time for the players, with morale favouring them; whereas in the Al-Kahraba match, there were two substitutions in the attack and midfield. Official matches last for more than 90 minutes however, numerous interruptions—such as substitutions fouls injuries goals or the ball going out of play—can have a negative impact on playing time (Linke et al., 2018). A reduction in playing time will have a negative impact on the other variables As for the variable of distance covered the momentum favoured the match played against Amanat Baghdad Club compared with the match played against Al-Kahrbaa Club, Based on the field researchers' observation of the matches, this is attributed to the fact that in the match against Amanat Baghdad, Amanat Baghdad had more possession than Al-Karkh whereas in the match against Al-Kahrbaa, Al-Karkh had more possession than Al-Kahrbaa; teams run more when not in possession than when they are in possession. Furthermore effective playing time and the amount of ball possession influence players' running performance (Mernagh et al., 2021). Players need to improve their endurance depending on their playing position; furthermore, endurance performance is not the only



factor determining the distance covered by players, as there are many factors that can influence activity levels such as the coach's tactics (Amani, 2018). This variable is also influenced by several factors the most important of which are the players' level of fitness their different playing positions, the standard of the opposing team whether or not the team has possession of the ball, and the actual playing time. In a study that linked the increase in distance covered during the first 15 minutes of a match to the success of teams such as Liverpool in implementing the high-pressing strategy (Gegenpressing)

This increases the chances of regaining possession by 30 per cent, whilst defenders who increase their off-the-ball movement (particularly when positioning themselves) reduce the opponent's chances of penetrating the area by 25 per cent (Castellano et al., 2022). Furthermore, professional footballers cover between 10 and 13 km per match, with 20–30 per cent of this distance covered at speeds exceeding 19 km/h or 5.27 m/s (Lovell et al., 2013). As for the work rate variable the results favoured the match played against Amanat Baghdad compared with the matches against Al-Talaba and Al-Kahraba.

The researchers attribute this to the fact that the distance covered by the players in the Baghdad Municipality match was greater than in the other two matches which consequently led to an increase in work rate. Players with a high work rate, such as midfielders and wingers demonstrate greater endurance for intermittent exertion, which improves the team's performance in pressing and regaining possession (Lovell et al., 2013). Teams that excel in terms of total distance covered and pressing have a higher probability of winning, particularly in competitive leagues such as the English Premier League (Carling et al., 2008). Furthermore, players with a high workload are better able to cope with sudden changes in match intensity, which reduces the risk of muscle injuries (Rahnama et al., 2003). Another study suggests that players with a high work rate motivate their teammates and boost team morale, particularly in difficult situations (Padrón-Cabo et al., 2018). As for the number of turns taken, morale was higher in the matches played against Al-Zawra'a and Al-Ittisalal compared with those played against Al-Talaba. The researchers attribute this to the fact that, in the match against Al-Talaba, Al-Karkh had more possession than in the match against (Al-Zawra'a and Al-Ittisalal), and that the team losing possession runs more and therefore requires a greater number of turns in response to the opposing team. Furthermore, the team that loses possession always needs to drop back and retreat in order to defend. Rapid changes in speed and direction in response to a stimulus are key aspects of the game; this is also known as agility. The researcher believes that coaches should focus on incorporating exercises that help develop reactive agility given its high effectiveness in various game situations and its status as a requirement of modern

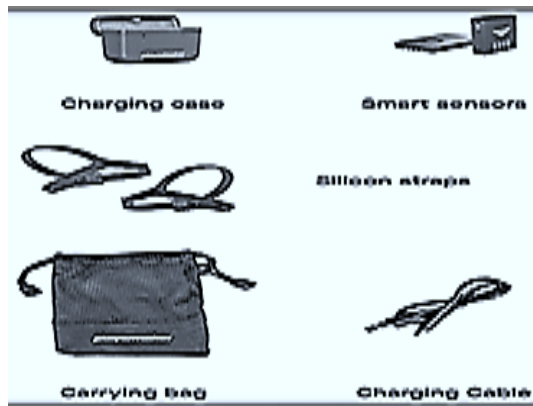


training. Speed combined with changes of direction places a significant mechanical load on the lower limbs which may lead to an increased risk of injury if poorly managed over time it is therefore crucial to plan carefully and monitor the load associated with the ability to change direction at high speed (Sheppard & Young, 2006). Players must adapt physically, physiologically and psychologically to the various factors associated with a match which may lead to changes and variations in technical and tactical actions and patterns whilst playing matches (Vilar et al., 2012).

Conclusions

The researchers concluded that there were no significant differences in Al-Karkh Club's performance levels in terms of the physical variables studied; this implies that there was no increase in performance levels or improvement in performance during matches, As for the statistically significant differences in the physical variables that were added (playing time distance covered, work rate, turns) between matches, these differences were linked to factors such as substitution strategies and ball possession. When the number of substitutions was low (as in the matches against Al-Ittihad, Al-Talaba and Al-Amana), Actual playing time increased, which boosted the players' performance, whilst these indicators fell in the match against Al-Kahraba due to frequent substitutions. Furthermore, loss of possession (as in the Baghdad Municipality match) led to an increase in running and turns due to the pressure to regain the ball, whilst physical activity decreased when in possession (as in the Electricity match). The high work rate (as in the Baghdad Municipality match) was linked to players enduring intermittent exertion, which supports pressing and ball recovery Rear turns meanwhile increased when possession was lost (as in the Al-Zawra'a and Al-Ittisalat matches) due to the need to drop back defensively which highlights the importance of training reactive agility alongside managing training load to prevent injuries. Finally the study confirmed that physical performance is influenced by external factors such as the opposing team's ranking and style of play which requires players to adapt both physically and psychologically. It is therefore recommended that training programmes focus on interval endurance and agility monitor training load, and analyse data in line with the opponent's strategies to enhance performance.

Appendix (1) A device shows the ‘Player-maker’ device and its components





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