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## PLAY POSITIONS AND LEFT VENTRICULAR MASS AND IT RELATIONSHIP WITH PHYSICAL VARIABLES FOR SOCCER PLAYERS

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### Abstract

*Aim.* Soccer can be classified as an impact loading sport. Because it characterized by various types of running with rapid changes in direction starts, stops, jumping and kicking, resulting in large ground reaction force (GRF) at the skeleton. The aim of this study was to determine the Effect of playing positions on Left Ventricular Mass (LVM), among Egyptian professional soccer players.

*Methods.* Data were collected on professional players from three positional Groups (defenders, midfielders, strikers) representing various Egyptian Premier League clubs during the 2015-2016 season. The committee granted ethical approval from the Egyptian Football Association. 24 players (9 defenders, 8 midfielders, and 7 strikers) from three different teams were selected in the study. All subjects were free of any disorders known to affect bone metabolism, such as bone fractures, osteoporosis, diabetes and cardiovascular disease. The participants did not report use of any anti-seizure drugs, alcohol and corticosteroid consumption, neither smoking cigarette. the coefficient of variation was < 1.5%.

*Results.* There are statistically significant differences between the Midfielders group and defenders group in high for the defenders group. No statistically significant differences between the defenders group and strikers group in high. There are statistically significant differences between the Midfielders group and strikers group in high for the strikers group. There are statistically significant differences between the Midfielders group and defenders group in weight for the defenders group. No statistically significant differences between the defenders group and strikers group in weight. There are statistically significant differences between the Midfielders group and strikers group in weight for the strikers group. There are statistically significant differences between the Midfielders group and defenders group in power for the defenders group. There are statistically significant differences between the defenders group and strikers group in power for the defenders group. There are statistically significant differences between the Midfielders group and strikers group in power for the strikers group. There are statistically significant differences between the Midfielders group and defenders group in leg strength for the defenders group. No statistically significant differences between the defenders group and strikers group in leg strength. There are statistically significant differences between the Midfielders group and strikers group in leg strength for the strikers group. There are statistically significant differences between the Midfielders group and defenders group in back strength for the defenders group. No statistically significant differences between the defenders group and strikers group in back strength. There are statistically significant differences between the Midfielders group and strikers group in back strength for the strikers group. There are statistically significant differences between the Midfielders group and defenders group in speed for the defenders group.

No statistically significant differences between the defenders group and strikers group in speed. No statistically significant differences between the Midfielders group and strikers group in speed. There are statistically significant differences between the Midfielders group and defenders group in respiratory endurance for the Midfielders group. No statistically significant differences between the defenders group and strikers group in respiratory endurance. There are statistically significant differences between the Midfielders group and strikers group in respiratory endurance for the Midfielders group. There are statistically significant differences between the Midfielders group and defenders group in left ventricular mass for the Midfielders group. There are statistically significant differences between the defenders group and strikers group in left ventricular mass for the strikers group. There are statistically significant differences between the Midfielders group and strikers group in left ventricular mass for the Midfielders group.

*Conclusions.* This analysis has shown that the assessment of Left Ventricular Mass, static muscular strength and kicking distance according to field positions among soccer players has very important, and coaches Must be developed and modified their training load according to individual capacity.

*Keywords:* Left Ventricular Mass, Positions, Endurance, soccer

### Introduction

Soccer is probably the most popular sport among the male population in the world, At least 220

million licensed players participate in soccer and 20 million soccer games are arranged each year in the world (Witvrouw, et al., 2003). Skilled movement must

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be executed under the situation of match related conditions of restricted space, limited time, physical and mental fatigue and opposing players. Soccer players have to possess moderate to high aerobic and anaerobic power, have good agility and joint flexibility, and be capable of generating high torques during fast movements (Reilly, et al., 2000).

Assessment of physical & physiological profiles on soccer players become important in recent years, in that training load can be decided according to individual capacity.

The physical data of the motor activity of the soccer player during the game refers to the ongoing dynamics of the components of fitness in general of endurance antenna and anaerobic and all of the speed and power of different kinds as well as the flexibility and agility, and the more of these elements level rose higher the player's ability to make the effort and tender throughout the 90 minutes without landing at the technical level (tactical skill), and the basic principles and fundamental tactical or of the ability to move and change deployment penetration depth widening centers offer the population density in the ball area support plans ....etc, depends primarily on the level of physical capabilities of the player. (Bangsbo, Mizuno 1988; Shephard, 1999)

Many scientific studies have been conducted to identify the different effects of the types of physical training on various vital organs, such studies and contributed to the development of sports training methods and also contributed to demonstrate the impact of some or all of the physical performance on aspects of the formative and functional organs and systems of the body ways, and thus those studies contributed increase in the continued development of physical and technical performance of the various sports.

The leading sports training to a different physiological changes include almost all parts of the body, and advanced level athletic performance whenever such changes positive to achieve the physiological adjustment to body organs to perform physical pregnancy and bearing performance with high efficiency with the economy in the effort, and the most important physiological changes that occur on the devices the body is that of the periodic system, in particular the work of the heart changes, where the practice of physical activity lead to increased heart size is normal limits factors for cardiovascular disease and as a result of this regular practice for long periods lead to changes in the construction and function of the heart.

And refers Bahaa (2000) to the cardiac circulatory system one of the most important organs in the human body, and the differences in heart muscle thickness are associated directly with the pressure of spatial in the walls of the four chambers of the heart, the left ventricle is the strongest for the four Chambers of the

heart during contraction, because the left ventricle pumps the blood to all parts of the body.

And each of the certain features and specifications of the play centers must be available in the player who occupies the center, and different priority specifications for each of them in accordance with the priorities of defensive and offensive duties in different places in the stadium, despite the significant increase occurring in the range of motion of the functions of each center and overlapping all over the kinesthetic with range of motion to the other center which suggests the universality of performance.

However, it is widely believed that physical activity has an important role in maximizing peak bone mass and reducing subsequent rates of bone loss. Observational epidemiological studies have consistently found that athletes have higher bone mass than people leading lifestyles that are more sedentary. In addition, the amount of load that is exerted on the skeletal tissue appears to be of importance. A number of studies of Left Ventricular Mass(LVM) among athletes showed that athletes who participated in "Impact - loading" sports (sports producing ground reaction forces greater than or equal to 3 times the body weight) had greater LVM than athletes who participated in a non-gravitational sport. (Grimston, et al., 1993)

The knowledge of the mechanisms of skeletal adaptation to mechanical loading and to metabolic conditions caused by physical activity is essential to prevent osteoporosis. Athlete studies can help to identify potential risks in young people for developing osteoporosis in their later years. (Timo, et al., 2010)

Soccer players are expected to have different physiological characteristics according to their playing positions (Dunbar and Power, 1995). On the other hand, some authors have reported that soccer players have similar physiological capacities in all playing positions (Capranica et al., 2001; Chamari et al., 2004; Guner, et al., 2006).

The researcher believes that the athletes with the highest fitness and health levels in general, and depending on the sport that they practice the type of understanding of the strongest and fastest, but they have a lot of endurance you do not find in others, so the occurrence of the death of one of them as a result of the sudden stopping of the heart (sudden death) draws a lot of attention, and produces it shook violent not to their relatives but also for a broad sectors of society especially those who calculate that practitioners of the sport are more people and prevention of heart failure and believe that exercise is the most important steps to be followed to protect against heart disease and circulatory system as well as its importance in maintaining good body health According to statistics on sudden death among.

Practitioners of the sport in the United States that nearly 100 athletes die suddenly while exercising in the sport each year.

As noted by the researchers through access to the national information network and the Internet and within science researcher not to eat any of the study centers play in soccer and its impact on the size of the left ventricle, prompting the researcher to address this topic.

Hence, the aim of this study was to determine the relationship between playing positions and left ventricular mass (LVM) with physical variables for soccer players

### Methods

#### Subjects

Data were collected on professional players from three positional Groups (defenders, midfielders, strikers) representing various Egyptian Premier League clubs during the 2015-2016 season. The committee granted ethical approval from the Egyptian Football Association. 24 players (9 defenders, 8 midfielders, 7 strikers) from three different teams were selected in the study. All subjects were free of any disorders known to affect bone metabolism, such as bone fractures, osteoporosis, diabetes and cardiovascular disease. The participants did not report use of any anti-seizure drugs, alcohol and cortison consumption, neither smoking cigarette.

#### Procedures:

Age, height, weight, body mass index and Training experience were recorded. Height was assessed with a standard tape measure on a wall; weight was measured with household scales.

#### Static strength test (LS) (BS)

### Results

Table 1. Anthropometric Characteristics Training experience of the Groups (Mean ± SD)

Group	N	Age [years]	Weight [kg]	Height [cm]	Training experience
Defenders	9	23 ± 1.2	76 ± 2.9	181 ± 3.1	16 ± 2.5
Midfielders	8	22 ± 0.9	75 ± 3.1	177 ± 2.2	14 ± 2.3
Strikers	7	22 ± 1.4	72 ± 3.2	179 ± 2.8	15 ± 1.1

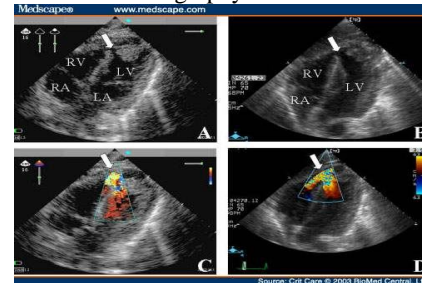
Table 1 shows the age and anthropometric characteristics of the subjects. There were no significant differences observed in the anthropometric characteristics and Training experience for the subjects in the different groups.

Table 2. Mean ± SD and Least Significant Difference Test "LSD" between three positional Groups (defenders, midfielders, strikers) in LVM and physical variables.

Issue	Source	Sum of Squares.	Degree of freedom	F test
High	Between groups	194.55	2	Sign
	Within groups	93.33	21	
Weight	Between groups	305.15	2	Sign
	Within groups	115.12	21	
Power	Between groups	313.20	2	Sign
	Within groups	103.66	21	
Leg strength	Between groups	53.35	2	Sign
	Within groups	28.70	21	
Back strength	Between groups	164.10	2	Sign
	Within groups	94.88	21	
Speed	Between groups	37.00	2	Sign

A Takei leg and back dynamometer was used to measure the static leg and back strength. The subjects stood on the dynamometer platform and crouched to the desired leg bend position, while strapped around the waist to the dynamometer. At a prescribed time they exerted a maximum force straight upward by extending their legs. They kept their backs straight, head erect and chest high. 3 trials were allowed to the subjects and the best score was taken. Subjects had a rest between the trials (Jensen & Fisher).

#### Echocardiography measurement



#### Statistical analysis:

All statistical analyses were calculated by the SPSS.V.16 (Statistical Package for the Social Sciences). The results are reported as means and standard deviations (SD). ANOVA analysis was used to compare the variety of the different variables between the three groups for static strength and regional bone. Least Significant Difference Test "LSD" was used to compare group means in variance analysis results that were found statistically significant. Differences in means were considered significant if p, 0.05



Endurance	Within groups	320.00	21	Sign
	Between groups	50.77	2	
Left ventricular mass	Within groups	166.88	21	Sign
	Between groups	89.15	21	
	Within groups	65.44	2	

Table 2 shows that:

- There are statistically significant differences between the Midfielders group and defenders group in high for the defenders group.
- No statistically significant differences between the defenders group and strikers group in high.
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- There are statistically significant differences between the Midfielders group and strikers group in back strength for the strikers group.
- There are statistically significant differences between the Midfielders group and defenders group in speed for the defenders group.
- No statistically significant differences between the defenders group and strikers group in speed.
- No statistically significant differences between the Midfielders group and strikers group in speed.
- There are statistically significant differences between the Midfielders group and defenders group in respiratory endurance for the Midfielders group.
- No statistically significant differences between the defenders group and strikers group in respiratory endurance.
- There are statistically significant differences between the Midfielders group and strikers group in respiratory endurance for the Midfielders group.
- There are statistically significant differences between the Midfielders group and defenders group in left ventricular mass for the Midfielders group.
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- There are statistically significant differences between the Midfielders group and strikers group in left ventricular mass for the Midfielders group.

Table 3. The correlation between static muscular strength in the legs and back, Kicking distance and LVM, BMC (Fem Neck Troch, Wards – Tri and L2-L4).

LVM	Endurance	Speed	Back Strength	Leg Strength	Power	Weight	High	issue
							0.085	High
						0.07	0.433-	Weight
					0.03-	0.079-	0.266	Power
				0.195	**0.369	0.25-	0.16-	Leg Strength
			0.14	0.06-	--15	0.18	0.22-	Back Strength
								Speed



		**0.667-	0.046	0.223	**0.876	0.018	0.088-	Endurance
	0.003-	**0.778-	*0.675-	0.174-	0.056-	0.057	0.249	LVM

\*R with 0.05 = 0.304

\*\*R with 0.01 = 0.393

Table 3: shows that:

- The high significant correlation between Leg Strength and LVM

### Discussion

Each sport is characterized by its unique physical and physiological demands in different age groups and positions that are of importance to assess the elite performers to understand the demands of the sports at different stages of development

Soccer involves intermittent high-intensity activities like running at different intensities, sudden accelerations and stops, rapid changes in direction, jumps, kicking and punting that result in significant ground reaction forces on the skeleton. Therefore, soccer can be classified as an impact loading sport (Alfredson, et al., 1995) involve in osteogenic activities (Wittich et al., 1998). Moreover, soccer practice induces positive adaptation of the bone tissue (Vincente-Rodriguez, et al., 2004).

The results of Table (1) showed a different levels of LVM in football players according to different places to play, and this is due to that each position playing is characterized by the capabilities of its own to distinguish them from the rest of the other positions, where the defense players must be to have the ability to jump and hitting the ball by head to prevent a goal as well as their ability to conduct the tackling quickly and also their participation in the attack and the exploitation of their machine.

Midfielders and strikers also engaged in significantly more of the 'other' type movements (jumping, landing, diving, sliding, slowing down, falling and getting up) with strikers performing the most of the three positions. As identified by Bangsbo (1997), extra physiological costs are created through on the ball and other movement activities. In terms of the latter, strikers and defenders fall to the ground most in match play with defenders required to get-up quickly more times suggesting this is another area important for physical preparation.

These positions also perform the most jumping which supports the findings of Bangsbo (1994) and Reilly et al. (2003) with defenders performing significantly more backward jumping. However, it also appears to be important for midfielders to have the ability to jump vertically.

Adding to, defenders were also observed to perform significantly more diving with feet first which may be related to attempts to intercept passes or block shots and crosses rather than making tackles as there were no differences seen in the number of tackles made by all positions. Defenders may also need to be the physically strongest players as they were found to perform the

- The high significant correlation between Back Strength and LVM
- The high significant correlation between Endurance and LVM

most physical contact at high intensity. Efficacy in pushing and pulling activities in the upper body as well as having abilities to withstand being pushed and pulled is desirable. In addition, strikers were also observed to have higher levels of stopping at high intensity as well as swerving and slowing more rapidly. These activities produce shearing forces on the lower limbs and appropriate strength training and rehabilitation practices must be adopted and emphasized (Besier et al., 2001). In similar respect, defenders should also have sufficient body strength in order to compete with the strikers.

In terms of directions travelled, the midfielders were also found to perform the most directly forward movements with defenders engaged in the highest amount of backwards and lateral movements. This is similar to previous findings of Rienzi, et al. (2000). The majority of diagonal and arc movements were performed in forward directions with midfielders and strikers performing more than defenders, which suggest these, are important directions in order to manipulate and create space or to evade a marker and be in a position to receive a pass from a teammate.

### Acknowledgments

Thank you to all of our participants of research.

### Conclusion

In conclusion, this analysis has shown that the assessment of Left Ventricular Mass, static muscular strength and kicking distance according to field positions among soccer players has very important, and coaches Must be developed and modified their training load according to individual capacity.

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