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Trend and Development of Soccer Research: An Observation

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Abstract

The game of soccer has been adopted by nearly every nation and it is one of the most decentralized sports in the world. Due to the popularity of soccer, several research studies on football's performance have been conducted to satisfy the people's interest. This systematic qualitative research used both online and offline approaches to compile the literature. Therefore, the current researcher would like to conduct an investigation that necessitates a study of soccer literature's trends and development. The primary objective of this academic qualitative study was to examine soccer-specific skills, system and formation-based soccer studies, somatotype research in soccer, fitness research in soccer, wearable Global Positioning System (GPS) technology in soccer game, and drone technology in soccer game. The relationship between manual digit ratio (2D:4D) and soccer is also discussed, as well as how the prenatal testosterone hormone can affect soccer performance. Researchers discovered that today's soccer game is more dynamic than previous types of soccer. The efficiency of skills is typically dependent on early decision making. The previous researchers have discussed new ways and methods for improving soccer performance. Since the issue is so extensive, the present researcher believes that more scientific research on soccer's trend and development is required.

Key Words: Soccer, Performance, Skill, Development, Trend, Technology

Introduction

Physical Education and Sports Science has grown significantly in recent years (Kohl et al., 2013). The subject area has now been recognized as both a university discipline and a professional specialty. New knowledge has become evident as sports science is gradually being applied not to sports in general, but to addressing problems in particular. Soccer has been one of those specific applications (Reilly & Williams (Eds.), 2003). Since soccer is a very innovative and dynamic game, players need to make decisions in a very complex situation (Bishop et al., 2017; Papanikolaou et al., 2019; Islam, 2018; Stølen et al., 2005). Watching this complex situation is based on all personal points of view. A general spectator when he watches the game, just watches the ball carrier, around the ball what's going on, but a scientific coach needs to watch the ball, and away from the ball what's going to happen (Islam, 2020; Brughelli et al., 2008). The coach must also anticipate the impact of a ball on all players in or out of possession. It is worth mentioning that extensive research is needed to understand those ever-changing situations which are non-linear (Islam, 2020; Machado et al., 2014; Cardoso et al., 2018; Gabbett, 2010; Stone & Oliver, 2009). So, the area of soccer research is a massive space. A great deal of soccer-related research has been

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done, including descriptive research, skills-related research, comparative research in small-sided games, motor fitness analysis, effects of scientific training, physiology and psychological impact on performance, talent identification research, GPS players positioning research, etc. In recent years the academic program also covers science and soccer. In the 1980s, Leicester University set up its research unit to focus on the sociological aspects of soccer. Liverpool John Moores University offered its first formal academic program in science and soccer in 1991. On the other side, FIFA supported the European-wide Master's Course on Soccer History (Reilly & Williams (Eds.), 2003). Among the most impressive achievements elsewhere was the recognition of the DSc for a study of physiological investigations directly related to soccer play (Bangsbo, 1993).

Football In the above discussion, it is clearly defined that a lot of research has been done on soccer games as if the area of soccer research is increasing as the popularity of the game is increasing. Undoubtedly, there have been many diverse studies on soccer in the world, and it is not possible to discuss all of them, so the current study sheds light on all the performance-based study that has helped soccer become modern.

Methodology

Aim of the Study

The specific endeavor of this scholarly qualitative study was to determine the trend and development of soccer research and how these studies improve game performance.

Acquisition of Evidence

In this systematic qualitative study, a careful online and offline search procedure was applied for the attainment of evidence. A critical analysis of the literature was conducted using electronic databases such as PubMed, Google Scholar, and Google Advanced Search.

Inclusion and Exclusion Criteria

Studies connected to the purpose of this study were integrated into this study, whereas studies that were not directly linked with the idea of analysis were disqualified from the process. Criteria for inclusion was included in the areas of soccer-specific skills, formation-based soccer games, the connection between digit ratio and soccer, somatotype studies in soccer, health and fitness-related soccer studies, GPS and drone technology utilizing in soccer game and scientific soccer coaching.

Research on Soccer-Specific Skills

Passing is an important individual attacking skill in the soccer game. The player should always try to move on to an unguarded teammate. There is a lot of soccer passing test (field test) built by soccer researchers. One of them is the Loughborough Soccer Passing Test (LSPT). The LSPT was developed to evaluate the multifaceted aspects of soccer skills including passing, dribbling, control, turning, decision making within the dynamic context. The objective was to complete the 16 repeated passes (two different distances) against the four coloured target areas situated on the benches (rebound board for sharp passing) as quickly as possible. LSPT examines the short, sharp passing that is more frequent in soccer rather than long passing. The test assesses

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the repeated short sharp passing in a dynamic context that represents the actual situation of the game (Ali et al., 2007; Ali, 2011; BenOunis et al., 2013).

Dribbling is a very significant attacking skill that excites players, coaches, and spectators, making unpredictable movements and intelligibility (Mal, 2004; Burgess et al., 2006). It is also a vital offensive technique for young players to develop ball control. However, dribbler may be moved a little further ahead if no opponent is around, but it must remain close enough to the player to retain control of the ball (Luongo, 2000; Northeast et al., 2019). While LSPT can measure passing accuracy, the performance of LSPT depends on ball control and dribbling ability. In LSPT, the ball needs to be controlled in a small rectangular space. On the other hand, the Mor-Christian Dribbling skill test must be conducted in a circular path (20-yard diameter) in the clockwise and anticlockwise direction. Mor and Christian general soccer ability (dribbling) is a valid and reliable test protocol for research (Mor & Christian, 1979).

Shooting is the most significant aspect of soccer because the nature of soccer is that players can create and look for the chance to score. Accuracy and speed of the ball is the key element of goal scoring. If accuracy is the number one goal, there is a need for accurate contact on the ball and for players to consider the impact of the different contacts on the ball flight (Lal, 2007; Radman et al., 2016; Buchheit et al., 2010; Finnoff et al., 2002). On the other hand, preliminary evidence suggests that a new video-based diagnostic instrument with a soccer-specific motor response may be used as part of a talent screening method to aid in decision-making performance evaluation (Murr et al., 2021). Consequently, it should be highlighted that all passing, dribbling, and shooting skills are required to improve soccer performance.

Study of Soccer Formations and Age-Specific Training

The way an active team lines up its defending third, middle third, and attacking third lines at the start of the game is known as team formation. Bradley et al., (2011) analyzed the English FA professional elite soccer matches and noted that the most successful passes were 1-4-4-2 compared to 1-4-3-3 and 1-4-5-1 formations. Soccer systems and match formation have also been studied by other researchers. A French league study found that players as a whole made more passes in 1-4-4-2 than in 1-4-2-3-1 formation (Carling, 2011). So, the 1-4-4-2 formation has a greater chance of playing short passes compared to other formations. Scientific research now discloses appropriate age-specific training. In grass-roots training sprinting and dribbling improved with age, especially between the ages of 12 and 14, but between the ages of 14 and 16, sprinting improved promptly as opposed to dribbling (Aquino et al., 2017; Huijgen et al., 2010). Similarly, another researcher found that technical skills and speed were the most key characteristics between the ages of 13 and 14. Furthermore, cardiorespiratory endurance was more important in the age of 15 to 16 (Vaeyens et al., 2006). However, fitness plays a key role in improving soccer performance, because the researcher found that passing and shooting performance declined following resistance exercise (Draganidis et al., 2013; Bloomfield et al., 2007; Bangsbo et al., 2006; Kohl et al., 2013). Researcher Bush and his team have extensively studied the seven consecutive English Premier League (2006-07 to 2012-13) in a position based on specific technical soccer performance. Central spine soccer players (midfielders and defenders) showed the most noticeable increases in total passes and accuracy rates, while full-backs and wide

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midfielders showed only small-moderate increases in total passes and accuracy rates (Bush et al., 2015).

Digit Ratio (2D:4D) May Connect With Soccer Performance

Performance of soccer is an art where players are an artist. An artist (soccer player) has to perceive attacking and defensive skills by which he/she can perform better. Attacking skills are use to dominate on the soccer pitch. However, attacking skills depend on two factors which are modifiable and non-modifiable. Non-modifiable factors are issues that cannot be changed, whereas modifiable factors can be changed. However, the manual second to fourth digit ratio (2D:4D) at the end of the first trimester is thought to be a biomarker of the prenatal testosterone hormone and estrogen hormone balance (Manning et al., 1998; Manning et al., 2014; Garn et al., 1975; Manning, 2002; Fink et al., 2006). The digit ratio (2D:4D), as a non-modifiable factor, is likely to remain constant throughout life. Interestingly coaches can change the performance value of motor fitness, body composition, and soccer-specific skills through scientific training. Whereas, digit ratio (2D:4D) is tentative to non-modifiable factors which cannot be changed significantly throughout life (Manning et al., 1998). The prenatal testosterone and estrogen hormone balance affects the growth of the brain and other organ systems development (Manning et al., 1998; Manning, 2002; Manning & Hill, 2009; Manning et al., 2007; George et al., 1981; Coates et al., 2009; Giffin et al., 2012; Fink et al., 2003). Professor John Manning states in his book "Striking a moving opponent or ball requires fine judgment of distance. Determining the exact point of impact demands an accurate perception of the surface of the target as it moves through space" (p.128) (Manning, 2002). Therefore cognition plays a critical role in performing soccer as every soccer action requires an excellent cognitive function (Scharfen & Memmert, 2019; Pruna & Bahdur, 2016). Indeed, the digit ratio is often meant to be a good predictor of adult steroid hormones. As a result, a player with low digit ratios experience more noticeable testosterone surges during tough events linked to high soccer performance efficiency (Manning & Taylor, 2001; Manning, 2002; Fink et al., 2003; Fink et al., 2003; Islam & Kundu, 2019; Islam & Kundu, 2020; Acar & Tutkun, 2019; Sánchez et al., 2021; Fink et al., 2006; Manning et al., 2014).

Somatotype Research in Soccer

The body composition is used to explain the proportion of players' body fat, bone, water, and muscle. Two players of similar sex and body weight may appear quite different from each other as they have a different composition of their bodies. The composition of the body is a process of describing what the body is made of. This includes fat, protein, minerals, and body water. It also describes weight more correctly ("What Is Body Composition?," 2020)**.** However, little body fat also raises a health risk, since the body needs a certain amount of fat (3%-5% of total body weight in males and 8%-12% of total body weight in females) for standard physiological functions (Ros et al., 2019). Essential lipids, such as phospholipids, are needed for cell membrane formation, while non-essential lipids, such as triglycerides found in adipose tissue, provide thermal insulation and store metabolic fuel (free-fatty acids) (Heyward & Stolarczyk, 1996). However, somatotype refers to an individual's current morphological state (Adhikari & Dash, 2020; Adhikari, 2016). A study of Canadian junior female soccer players found that they had average muscularity and a

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considerably higher fat percentage than female athletes at the national level. That is why scientists advised that group to gain more muscularity while losing fat (Adhikari & Nugent, 2015).

Fitness Research in Soccer

Health-related physical fitness describes the overall good health of the individual. Playing soccer develops health-related physical fitness skills. Research has shown that adolescent soccer players have significantly higher physical fitness than untrained adolescents (Hammami et al., 2018; Loturco et al., 2019; Orendurff et al., 2010; Bangsbo, 1994; De & Ghosh, 2016). Recreational soccer (RS) is becoming a common way for people of all ages to stay fit and healthy. Every day RS training contributes to substantial cardiovascular and muscular improvements in both sedentary people and clinical patients of all ages, implying that RS may be a highly motivating tool for improving population health (Hammami et al., 2016; Roy et al., 2016). Whereas, soccer practice involves a lot of decision-making, a study found that higher levels of physical activity are beneficial to cognitive performance (Williams et al., 2020; Jones et al., 2013). However, the soccer performance rank could be used to determine a player's fitness, as shown by soccer-related research. The average distance covered by teams in the First and Second Division Leagues were close, but the distance covered at high intensity and very high intensity were greater in the First Division Leagues (Gomez-Piqueras et al., 2019).

GPS Technology in Soccer Game

In today's world, using various forms of technology to measure soccer players' performance assists coaches in making tactical decisions and preserving players' wellbeing (Almulla et al., 2020). During a match or practice session, the wearable Global Positioning System (GPS) is used to measure the position of the players for each second in time (Ric et al., 2017; Castagna et al., 2017). While analyzing the readings by coaches, and technical staff does not require particular skills, monitoring the physical performance of the players does. Monitoring physiological performance, on the other hand, necessitates the use of more advanced clinicians and the application of particular expertise to interpret research findings (Almulla et al., 2020). Indeed, in soccer, GPS technology has been used in both training sessions and competitions. Teams may use Electronic Performance and Tracking System (EPTS) to monitor players' movement on the field and collect a vast amount of data on their performance, including their running speed, sprint distance, position on the field, heart rate, and bodywork rate (Arastey, 2018).

Drone Technology in Soccer Game

Nowadays drone technology is used in soccer research. Drones have the advantage of being able to reach anywhere on the field, which is difficult for coaches to do. Any location and form of the team are likely to be difficult to see from the technical area for soccer coaches. In the technical area, soccer coaches and managers have only a side-view of each play, which is very limited and vulnerable to tactical misinterpretation (Powderly, 2016; Arena, 2018). The image and footage captured by the drone may have been used to assess the offensive and defensive team shapes in the soccer match. Altogether, a drone in soccer coaching is a modern soccer coach's flying astute eye seeing the best of the game (unofficial matches) or practice sessions (Islam, 2020).

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Conclusion

Without a doubt, soccer's acceptance and growth have gone through many ups and downs to achieve its current enjoyable state. It is impossible to discuss the trend and advancement of soccer research in a research paper because soccer research is such a large phenomenon. However, it has been proved on all counts and based on observed data that soccer performance is currently the primary concern for researchers and coaches. Coaches and researchers used several technologies and methods to develop the performance of the overall soccer game in multifaceted aspects. For instance, LSPT develops passing accuracy in a dynamic situation, and this field test can be utilized to recruit young players. Coaches, interestingly, may employ the 2D:4D finger length ratio. Low digit ratio may be linked to player aggression and visio-spatial abilities. High skill performance is heavily reliant on visio-spatial ability. Somatotype tests also aid researchers in gaining a better understanding of the athletes' actual body shapes. On the other hand, GPS and drone technologies are expected to assist coaches and researchers in identifying the defensive and attacking team shapes, which may also aid in the team organization of a modern coach's tactical strategy.

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Conflicts of Interest

There are no conflicts of interest.

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