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# Position difference and physical fitness demand of soccer player performance in competition activities

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## Abstract

The difference of position division and duty of players in soccer matches determines the physical fitness difference between players to some extent. The performance of different positions of soccer players in competition activities is analyzed from running distance, running strength and the use of skilled movements to explore the physical demands of players in different positions on the soccer field, and suggestions on positional physical fitness training of players are put forward, whose purpose is to help coaches update training concepts and provide a reference for the scientific implementation of positional physical fitness training of soccer players.

## Keywords

soccer players: positional physical fitness; physical fitness demand; training.

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## 1. Introduction

Match formation is the form of position arrangement, offensive and defensive force collocation and division of responsibilities of players in competition field [1]. Practice has proved that the strength of a team must be shown a through certain formation in matches, and the formation exists to play the strength of the team. The match formation divides the general activity areas of players in different positions and specifies the specific responsibilities of players in different positions. However, due to the fact that there is no rigid division of position and responsibilities in the actual competition, the players in different positions have higher requirements. This kind of high requirement is mainly reflected in the excavation and improvement of players' competitive abilities. Physical fitness is the prerequisite to develop and play the competitive abilities of athletes, and being the material basis of soccer competitive sports [2], it plays an important role in the fierce soccer competitions. Relevant research has confirmed that the players in different positions of soccer matches have larger differences in physical fitness demands in order to complete technical and tactical needs. Therefore, by comparing the differences of players in different position of competition activities, the characteristics of physical fitness demands of players in different positions are explored, which has an important theoretical and practical significance for scientifically guiding physical fitness training and enhancing the pertinence of physical fitness training.

## 2. Position difference of soccer player performance in competition activities

### 2.1 Position difference of running distances

Soccer is a confrontational item in running, and running is the most basic competitive ability of players. Research shows that the energy consumed by a certain running distance is related to the total amount of mechanical movement, and it is not related to the running speed [3], which shows that the individual running ability of soccer players can be roughly expressed by the running distance in the competition.

To a great extent, the running distance of a player represents the effort of the player in the competition and his personal contribution to the team. Through a series of researches on the running situation of players in competitions, many scholars find that the running distance of players varies from the different positions of players. For example, the study made by Reilly and Thomas [4] on the players in England League found that among perimeter players, the avant-garde players run the longest distance in the competition, and center back players run the shortest distance in the competition, and the running distance of center back players has the largest maximum fluctuation range (7324 to 10023 meters). The running distance of forward players is between the avant-garde players and the center back players, and due to the special position of the goalkeeper, his moving distance is about 4,000 meters. Ekblom [5]'s observation on the running distance of the Swedish players also confirmed the influence of different positions of players on the running distance. His research found that the average running distance of the avant-garde players was 10,600 meters, which is 5% higher than the average of the whole team, and the average running distance of the forward players was 10,100 meters, and the average running distance of the guards was 9,600 meters. The study made by Bangsbo [6] and other Danish players also showed that the average running distance of the avant-garde players was 11,400 meters, which was significantly higher than that of the forward players whose average running distance was 10,500 meters and that of the guards whose average running distance was 10,100 meters. The study made by Gu Xiaomin and Liu Dan [7] on the running distance of Chinese women's soccer team players in competitions found that the average running distance of the avant-garde players was 9,143 meters, which was more than that of the forward players whose average running distance was 8,663.9 meters and that of the guards whose average running distance was 8,046.7 meters. The study made by Liu Dan [8] on the running distance of Chinese men's national soccer team players in competitions showed that average running distance of the avant-garde players was 9,991 meters, which was more than that of the defenders whose average running distance was 9,453 meters and that of the forward players whose average running distance was 9,208 meters. Generally speaking, the running distance of players in different positions on the field is basically as mentioned above, and the occasional special case is also due to tactics.

Due to different position divisions of players on the field, the responsibilities and tasks of players must be different, which not only is the main reason leading to different running distances of players, but also is the inevitable result for players in different positions to adapt themselves to the competition. The difference of players' running distances, on the one hand, is the objective requirement to complete the competition by performing players' respective duties and duties and working together, on the other hand, is the true reflection of the different positions on the soccer field.

## 2.2 Position differences of running intensity

If the "number" of running distances is only used to analyze the running ability of players in different positions in the match, the special characteristics of soccer match will be covered. Therefore, it is necessary to further analyze the running situation of players in different positions from the "quality" of running, which can better reflect the running characteristics of players in different positions. The research made by Reilly and Thomas [4] found that in the running distance of goalkeepers, walking accounted for 33.7%, jogging 27.4%, full power run 12.5%, sprint run 0.8% and back movement 25.6%. Statistics made by Bangsbo [9] of the frequency of movement mode and the average time occupied by various movement modes in the match participated in by Danish League players found that the avant-garde players have significantly higher frequency and duration of low-speed running than the forward players and the guards; the forward players have higher times of high-intensity running than the avant-garde players and the guards. Statistics made by Pierre Barrieu [10] of the proportion of different types of running in running distance of players in different positions discovered that the running distance of the avant-garde players includes 31% walking, 38% jogging ( $< 80\% \text{VO}_2\text{max}$ ), 20% high-intensity run (about  $80\% \text{VO}_2\text{max}$ ) and 11% sprint run ( $\geq 85\% \text{VO}_2\text{max}$ ); the running distance of the forward players includes 29% walking, 35% jogging, 23% high-intensity run

and 13% sprint run; the running distance of center backs includes 36% walking, 41% jogging, 17% high-intensity run and 6% sprint run; the running distance of full backs includes 29% walking, 41% jogging, 20% high-intensity run and 10% sprint run. Study made by Gu Xiaomin and Liu Dan [7] of the running situation of players of Chinese women's soccer team in different positions found that the forward players have obviously higher high-strength running and aerobic low-intensity running than the players in other positions.

It can be seen that there are different running intensities of players in the match, and the main reason for differences is different positions of players. The players should adjust their running intensity according to their positions, responsibilities and actual needs in the match, so as to realize the technical and tactical cooperation of the whole team and achieve the goal of winning the match.

### **2.3 Positional differences in the use of technical movements**

The application of a series of players' technical movements related to the match is one of the most significant features in the match. Modern soccer training theory believes that technical ability is the decisive factor of soccer players' competitive ability. Without technology, we can't talk about formation and tactics, and without technology, there is no real strength, so we can't compete with our opponents. In a sense, it can be said that the factors that directly affect the soccer match are the application of technical movements of both players. However, it is worth noting that different positions of players also show some differences in the frequency of application of some technical movements. Reilly and Thomas [4] have found that center backs and forward players have higher jumping frequencies than guards and midfield players. The related research made by Withers [11] also confirmed that center backs and forward players have higher frequencies of heading the ball than guards and midfield players.

The study made by Bangsbo [6] on Danish League players also found that the forward players have higher number of heading than the avant-garde players and the guards. These studies only reflected the differences in the number of player technical applications in different positions from the frequency of jumping and the number of heading. However, in other technical applications, such as dribbling, ball control, ball passing, ball handling and shooting, it can be considered that the frequency of these technical applications will also show some differences among the players in different positions with different positions of players and needs in the match.

Although the development of soccer puts forward higher requirements on the comprehensiveness of soccer players, technical requirements for players in certain adjacent positions are getting closer, but some positions still have their special requirements, such as center forward and centre halfback, and even in the adjacent positions, the application of certain technologies will also have some focuses and differences.

## **3. Positional physical fitness demands of soccer players**

### **3.1 Physical fitness demands of forward players**

Generally speaking, in the match, the running distance of the forward players is higher than the defenders and lower than the avant-garde players; however, the high-intensity running of the forward players is much more than that of the avant-garde players and the defenders, which is consistent with the position characteristics of the avant-garde players. The avant-garde players need to have the ability of repeated starts in a short time and sprints in a short distance, especially the strong ability of repeated sprints in order to lure the defenders to lose their positions and break through the lines of defense of their opponents. At the forefront of the attack, the forward players usually play the role of a knife and a gunner. Therefore, attack is the main duty of the forward players, while defense is not the main duty of the forward players, but with the active participation of the forward players in defense can reduce the team's pressure on the defense, which will undoubtedly put forward higher requirements for physical fitness of the forward players.

### **3.2 Physical fitness demands of avant-garde players**

The research shows that the running distance of the avant-garde players is significantly higher than that of the forward players and the guards, and in particular, the running intensity of aerobic movement increases significantly, which is consistent with the position characteristics of the avant-garde players. Practice of the competition has proved that running is the most prominent characteristic of the avant-garde players. The avant-garde players play the role of bridge and offensive and defensive hub in the team with the remarkable responsibility of total soccer, and in order to improve the efficiency of attack and defense, they must run towards all four directions to create an opportunity of scoring a goal, so their running distance is significantly higher than that of other players naturally. It can be said that aerobic ability is very important for the avant-garde players, and of course, in order to improve the dribbling and intercept abilities in the match, it also has certain requirements for the anaerobic ability.

### **3.3 Physical fitness demands of guards**

In general, the running distance of the defenders is fewer than that of the avant-garde players and players, and because of the need to the guards and the offensive players in the match, the activity characteristics of the defenders are similar to that of the offensive players. Accurate adjustment, reasonable position and accurate dribbling skill can reduce the number of the guards who repeatedly follow the offensive players for repeated sprints passively, thereby reducing the running distance and the running intensity. Strictly speaking, in the guards, the running characteristics of the full backs and the center back are different. The full backs need to provide more frequent assists and pay more attention to the offensive players, so the running distance of them is more than that of the center back, and they regard the running with high intensity as the main running in assists; the center back often enter the other's restricted area to participate in the attack of corner kick, free kick and place kick, and the center back must have a good ability of bouncing and heading regardless of offensive and defensive.

### **3.4 Physical fitness demands of goalkeepers**

Goalkeeper's position is relatively fixed, and his main responsibility is to defend the goal of the team, which has different position characteristics from the forward players and guards. He may not directly take part in the match for a few minutes and he is more likely to be in a static state, whose standing time is much more than other that of the players in other positions and moving distance is also the shortest, and he is more likely to be in a low-intensity motion state. However, he must maintain the excitement of the match and high attention, and there is a high demand for anaerobic capacity in movements, especially the ability of jumping to catch balls and diving for ball.

## **4. Conclusion and suggestion**

Because there are some differences in activity characteristics of players in different positions in the competition, in physical fitness training, it is necessary to carry out targeted physical fitness training by closely integrating position characteristics and positions of players. Specifically speaking, when training the forward players, the repeated sprint ability in short times and short distances should be highlighted, and the distance and frequency of high-intensity running should be increased; when training the avant-garde players, we should put aerobic capacity in an obvious place to improve running ability and properly develop anaerobic capacity; when training the defenders, we should emphasize the ability of high-intensity running and improve the ability of bouncing and heading; when training the goalkeepers, we should emphasize the training of anaerobic ability, such as continuous jumping to catch balls and diving for ball. It is worth noting that in the actual physical fitness training, we should also consider the individual characteristics of players in different positions.

When carrying out the physical fitness training of players in different positions, it is necessary to combine high-intensity training with a ball with antagonistic training as a means to improve the level of actual combat. The characteristics of soccer competitions need the players complete the technical

action of various processing balls in the high-intensity confrontation, so heavy-intensity training form with the combination of a ball is more in line with the requirements of the practical combat in soccer.

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