Turkish Journal of Sport and Exercise /
Türk Spor ve Egzersiz Dergisi
http://dergipark.gov.tr/tsed
Year: 2024 - Volume: 26 – Issue 2- Pages: 138-144
10.15314/tsed.1507305

Turkish Journal of Sport and Exercise
Türk Spor ve Egzersiz Dergisi
ISSN: 2147-5652
https://dergipark.org.tr/tr/pub/tsed

The effect of positional differences on technical parameters in different parts of the pitch in soccer

Veysel BÖGE [1A]

[1] *Selcuk University, Faculty of Sport Sciences, Department of Coaching Education, Department of Sport and Health, Konya, TÜRKİYE*
Address Correspondence to Veysel BÖGE: e-mail:. veyselboge@selcuk.edu.tr

Ethical Statement: It is declared that scientific and ethical principles have been followed while carrying out and writing this study and that all the sources used have been properly cited.

(Date Of Received): 01.07.2024 (Date of Acceptance): 31.07.2024 (Date of Publication): 31.08.2024
A: Orcid ID: 0000-0002-8639-1983

Abstract

The aim of this study was to investigate the effect of positional differences on technical parameters in different parts of the pitch in soccer. For this purpose, 22 healthy male soccer players participated in the study. The mean age of the participants was 22±1,46 years, mean height was 176,27±5,76 cm, mean body weight was 68,83±5,60 kg and mean body mass index (BMI) was 21,67± 1,23 kg/m². The participants were divided into 3 groups according to their positions as defender, midfielder and attackers with 5 people in each group, in addition to this, a fixed group of 5 players was formed and two different goalkeepers were included in the study at different stages of the game. One-Way Anova test was used to determine the difference between the groups. In the first zone, the rating of perceived exertion (RPE) values of the attacker players showed a significant difference, while no difference was observed in the other parameters. In the second zone, only the ball possession (BP) values of midfielder players made a significant difference. In the third zone, both defense and midfielder players made more vertical and diagonal passes (DVP). In conclusion, when the various technical actions of players in different positions in the three zones of the game are analyzed, although there are differences in some parameters, in general, positional differences in different zones do not show a significant change.

Keywords: Ball possession, diagonal passes, rating of perceived exertion and soccer.

Futbolda Sahanın Farklı Bölümlerinde Pozisyonel Farklılıkların Teknik Parametrelere Etkisi

Özet

Bu çalışma ile futbolda sahanın farklı bölümlerinde pozisyonel farklılıkların teknik parametrelere etkisinin incelenmesi amaçlanmıştır. Bu amaçla çalışmaya sağlıklı 22 erkek futbolcu katılmıştır. Çalışmaya katılan futbolcuların yaş ortalamaları 22±1,46 yıl, boy uzunluğu ortalamaları 176,27± 5,76 cm, vücut ağırlığı ortalamaları 68,83± 5,60 kg ve vücut kütle indeksi (VKİ) 21,67± 1,23 kg/m² dir. Katılımcılar mevkilerine göre savunma, orta saha ve hücum olmak üzere her grupta 5 kişi olacak şekilde 3 gruba ayrılmış, buna ek olarak 5 kişilik sabit bir grup oluşturulmuş ve oyunun farklı aşamalarında iki farklı kaleci de çalışmaya dahil edilmiştir. Gruplar arasındaki farkın tespit edilmesinde One-Way Anova testi kullanılmıştır. Birinci bölgede hücum oyuncuların algılanan zorluk dereceleri anlamlı fark oluştururken diğer parametreler de fark görülmemiştir. İkinci bölgede ise sadece orta saha oyuncularının topa sahip olma değerleri anlamlı fark yaratmıştır. Üçüncü bölgede ise hem savunma hem de orta saha oyuncuları daha fazla dikey ve diagonal pas yapmıştır. Sonuç olarak, oyunun üç bölgesinde farklı pozisyonlarda yer alan oyuncuların çeşitli teknik aksiyonları analiz

edildiğinde, bazı parametrelerde farklılıklar görülse de genel olarak farklı bölgelerdeki pozisyonel farklılıklar önemli bir değişiklik göstermemektedir.

Anahtar Kelimeler: Algılanan zorluk derecesi, diyagonal pas, futbol ve topa sahip olma.

INTRODUCTION

Soccer is a game consisting of two halves of 45 minutes each, with a 15-minute half-time break. To be successful in soccer, many factors need to come together, including high levels of tactical, technical and physical parameters. For 90 minutes, various versions of power and explosiveness should be displayed intermittently, as well as various technical and tactical combinations (2, 10, 22). In some studies, it is stated that the most critical moments and determining factors of soccer include explosive actions such as high-speed runs and sprints along with various technical skills (3, 21, 12). As can be seen from this information, soccer involves a very complex structure. The complex structure of soccer also leads coaches to search for various training methods. Research shows that there is an evolution towards training that incorporates different approaches rather than traditional training models (17). These new trends have different methodological perspectives, such as the modified use of the game (7). In this context, drills-oriented activities in training are the most preferred practices by coaches, especially in team sports (14).

Small-sided games (SSGs) have recently become a very popular training practice with various manipulations made by coaches on the playing field. SSGs are also seen as smaller versions of official competition conditions to increase athletes' perception of tactical problems that occur during competitions and to create desired behaviors in athletes (8). When considering official soccer competitions, small-sided games are considered as a practice that encompasses all dynamic and complex elements, especially the basic features of the chaotic nature of soccer (20).

When the positional differences in modern football are considered in terms of physical and motor characteristics, it is thought that the differences are gradually disappearing (1). When we consider that the details in soccer make a difference, it is expected that the technical parameters of the players in different positions will constitute the main differences in the game.

In the light of this information, there are many studies in the literature on various manipulations such as the dimensions of the field (small, medium and large) in training. With this study, unlike small-sided games, the sections of the game (Zone 1, Zone 2 and Zone 3) in the official soccer competition are preserved exactly in the training sessions and players of different positions are made to play soocer in these areas and the observation of the difference between them is a subject that is not included in the literature, which reveals the originality of the study. With this study, it is aimed to examine the effect of positional differences on technical parameters in different parts of the field in soccer.

METHOD

Participants

This study was carried out with 22 male soccer players between the ages of 18-25 who are actively training in Konya Amateur league teams. It was determined as a criterion that the participants did not have any health problems and sportive injuries.

According to the positions of the participants, they were divided into 3 groups as defense, midfield and offense with 5 people in each group, in addition to this, a fixed group of 5 people was formed, and two different goalkeepers were also involved in the study at different stages of the game. The main condition for participation was that the participants had been actively playing soccer in the last 3 years and had no health problems.

Table 1. Descriptive statistics of participants in different positions

Variables	N	Mean	Standard Deviation (SD)
Age (years)	22	22	1.46
Height (cm)		176.27	5.76
Body weight (kg)		68.83	5.60
Body mass index (BMI)		21.67	1.23

Measurement Methods

Height and Body Weight Measurement

In the study, the height of each subject was measured with a stadiometer with an accuracy of 0.01 meters (m) and body weight (BW) was measured with an electronic scale (SECA, Germany) with an accuracy of 0.1 kilogram (kg). During the height measurements, the volunteers were standing with bare feet, heels together, knees stretched, body and head erect, and eyes facing forward. When the sliding caliper bar touched the head of the volunteers, it was stopped, and the closest value was recorded as the height value in centimeters (cm). During weight measurements, subjects participated with bare feet and wearing shorts that would not affect their weight. The value obtained on the scale screen was recorded in kg.

Technical Actions and Analysis

All actions from the beginning to the end of the study were recorded with a camera at a height of 10m and technical actions were evaluated in 12 categories. These categories were; Ball possession (BP), successful passing (SP), diagonal and vertical passing (DVP), landscape and behind passing (LBP), dribbling (DRB), interception (INT), use of goalkeeper (UGK), lost ball (LB), Transition(T), transition from zone 1 to zone 2 (T1-2), transition from zone 2 to zone 3 (T2-3), transition from zone 3 to zone 2 (T3-2), transition from zone 2 to zone 1 (T2-1) and transition from zone 3 to zone 2 (T3-2). The studies were carried out by using an observational methodology (coding of actions) to obtain data on technical actions from images recorded from a height of 20 meters with a view of the entire playground. Each action of the technical parameters was recorded as a marking and the total numbers at the end of the two sets were divided by 2.

Rating of perceived exertion

Rating of perceived exertion (RPE) is a psycho-physical measure of effort and is traditionally obtained on a 6-20 or 10-point scale (4). In this study, the perceived exertion of the athletes will be determined after the sets using the Borg scale of 0-10.

Design of Experiments

Ethics Committee Decision

This study was approved by the Non-Interventional Ethics Committee of Selçuk University Faculty of Sport Sciences (Approval number: E.776233).

Data Analysis

Statistical evaluation was performed using SPSS 29.0 package program. The data obtained in the study were presented as mean and standard deviation. Shapiro-Wilk test was applied to determine the distribution of the data and the data showed normal distribution. According to the result of the normality distribution, One-way ANOVA test was applied to determine the difference in the balance performances of soccer players by position. The results were evaluated at 95% confidence interval and $p<0.05$ was considered significant.

FINDINGS

Table 2. Rating of perceived exertion (RPE) in different parts of the soccer field

Zone	*Defenders (n=5)*	*Midfielders(n=5)*	*Attackers(n=5)*	P
Zone 1	4 ± 1.41	4.8 ± 0.76	2.4± 0.89	**0.011***
Zone 2	3.4± 0.42	3.5± 1.6	3.7± 0.84	0.278
Zone 3	3.8± 0.57	3.9± 0.89	2.9± 0.65	0.092

*: shows a significant difference **(P<0.05).**

When Table 2, which shows the rating of perceived exertion of the soccer players in three different zone, it was observed that only in the 1st zone, rating of perceived exertion the attacker's players showed a significant difference compared to the midfield players (P<0,05).

Table 3. Some technical actions of soccer players in different positions in zone 1 of the soccer field

Parameters	*Defenders(n=5)*	*Midfielders(n=5)*	*Attackers(n=5)*	f	P
BP (sc)	106.5 ± 0.71	101.5± 36.06	122.5± 7.78	0,530	0.635
SP (t)	30.5 ± 2.12	36.5± 4.95	30 ± 1.41	2,532	0.227
DVP (t)	18.5 ± 0.71	16.5± 0.71	15.5± 0.71	9,333	0.052
LBP(t)	17.5 ± 0.71	15± 5.66	19 ± 2.83	0,605	0.602
DRB(t)	3 ± 1.41	1± 1.41	1 ± 1.41	1,333	0.385
INT(t)	1.5 ± 0.71	2 ± 0	1 ± 0	3,000	0.192
LB(t)	5.5 ± 2.12	5 ± 0	5 ± 1.41	0,167	0.854
UGK(t)	7.5 ± 0.71	5.5± 2.12	9,5 ± 4.95	0,814	0.522
T1-2(t)	4.5 ± 2.12	3.5± 2.12	4 ± 0	0,167	0.854

BP: Ball possession, **SP: Successful pass, DVP:** Diagonal and vertical pass, **LBP:** Landscape and behind pass, **DRB:** dribbling**, INT:** Interception**, LB:** Lost ball**, UGK:** use of goalkeepers**, T1-2:** Transition from Zone 1 to Zone 2. **sc:** seconds**, t:** times *: shows a significant difference **(P<0.05).**

In Table 3, some technical parameters of soccer players of different positions in the first zone of the game were analyzed. No significant differences were observed in the nine different parameters analyzed (P>0,05).

Table 4. Some technical actions of soccer players in different positions in the 2nd zone of the soccer field

Parameters	*Defenders(n=5)*	*Midfielders(n=5)*	*Attackers(n=5)*	f	P
BP (sc)	49 ± 11.31	68 ± 11.31	119.5± 10.61	21,665	**0.016***
SP(t)	25 ± 7.07	34.5 ± 3.53	42 ± 7.07	3,871	0.148
DVP(t)	9 ± 2.83	16 ± 1.41	16.5± 3.54	4,689	0.119
LBP(t)	11.5 ± 9.50	10.5± 0.71	20.5 ± 2.12	6,169	0.086
DRB(t)	2.5 ± 2.12	0.5 ± 0.71	3 ± 1.41	1,500	0.354
INT(t)	3 ± 0	2.5 ± 0.71	3 ± 0	1,000	0.465
LB(t)	3 ± 1.41	3.5 ± 0.71	2.5 ± 0.71	0,500	0.650
T2-3(t)	3.5 ± 0.71	2.5± 0.71	3 ± 0	1,500	0.354
T2-1(t)	2.5 ± 0.71	3.5± 0.71	2.5 ± 0.71	1,333	0.385

BP: Ball possession, **SP: Successful pass, DVP:** Diagonal and vertical pass, **LBP:** Landscape and behind pass, **DRB:** dribbling**, INT:** Interception**, LB:** Lost ball**, T2-3:** Transition from Zone 2 to Zone 3, **T2-1:** Transition from Zone 2 to Zone 1. **sc:** seconds**, t:** times *: shows a significant difference **(P<0.05).**

In Table 4, some technical parameters of soccer players of different positions in the second zone of the game were analyzed. When the ball possesion (BP) of attacker players was examined, it was observed that they possessed the ball more than defensive players in the second zone of the game, and this difference was statistically significant (P<0,05).

Table 5. Some technical actions of soccer players in different positions in the 3rd zone of the soccer field

Parameters	*Defenders(n=5)*	*Midfielders(n=5)*	*Attackers(n=5)*	f	P
BP (sc)	76 ± 22.63	54.5 ± 14.85	54.5±14.85	0,970	0.473
SP(t)	30.5 ± 3.54	29.5 ± 4.95	19 ± 2.83	5,411	0.101
DVP(t)	15 ± 0.0	15.5 ± 0.71	11.5 ± 0.71	28,500	**0.011***
LBP(t)	12.5 ± 2.12	9.5 ± 3.54	5 ± 1.41	4,500	0.125
DRB(t)	3 ± 1.41	3.5 ± 0.71	3.5 ± 2.12	0,071	0.933
INT(t)	1 ± 1.41	2.5 ± 0.71	2.5 ± 2.12	0,643	0.586
LB(t)	2.5 ± 0.71	4 ± 0	6 ± 1.41	7,400	0.069
T3-2(t)	4 ± 0	3.5 ± 0.71	4 ± 1.41	0,200	0.829

BP: Ball possession, **SP: Successful pass, DVP:** Diagonal and vertical pass, **LBP:** Landscape and behind pass, **DRB:** dribbling**, INT:** Interception**, LB:** Lost ball**, T2-3:** Transition from Zone 2 to Zone 3, **T3-2:** Transition from Zone 3 to Zone 2. **sc:** seconds**, t:** times. *: shows a significant difference **(P<0.05).**

In Table 5, some technical parameters of soccer players from different positions in the third zone of the game were analyzed. When the diagonal and vertical passing (DVP) numbers of midfielders and defenders were examined, it was observed that both groups made more diagonal and vertical passes than attacker players in the third zone of the game, and this difference was statistically significant (P<0,05). No significant difference was observed in other parameters in the third zone (P>0,05).

DISCUSSION AND CONCLUSION

In soccer, development is targeted through various situations such as the limitation of field space, manipulation of training times and recovery times. In addition, in today's soccer, a player is expected to perform in every area of the game regardless of his position. In this study, it was aimed to examine the effect of positional differences of players on technical parameters in different parts of the pitch considering these current situations. Like the method used in this study, we see that researchers use notational analysis to examine parameters such as passing, dribbling and interception (19). In addition to technical parameters, there are many methods for determining the training load. One of the most preferred among these methods is the rating of perceived exertion (13). Similarly, in our study, rating of perceived exertion was used to determine the training load.

In the literature, RPE values of soccer players after SSG games were found to be in the range of 5-8,9 (11, 9). In this study, when we examined the general RPEs of the three zones, the average RPE values were observed between 2,4 and 4,8. It is thought that the difference may be because the players played in wider areas than the SSGs. In addition, in the study, the average of the two RPE values taken at the end of the sets of the offensive games in the first zone was found to be 2,4. This value may suggest that the offensive players moved more easily in the first zone. In other zones, there were no significant positional differences in RPE values.

Joo et al (15) observed a significant increase in the number of vertical passes and total passes of players in larger field formats in the 7-vs 7+GK format application. While there was no significant difference between the groups in the number of vertical passes (P>0,05) in the format where +1 numerical superiority was provided by the use of a goalkeeper in the first zone of the field, it was found that the number of vertical and diagonal passes of the defensive and midfield players increased significantly compared to the offensive players when the opponent had +1 superiority in the third zone (P<0,05).

In a study examining various technical actions during SSG in three different dimensions, no significant difference was found in the number of passes, interceptions and headers (16). Similarly, when the technical actions in the first, second and third zones of the study were analyzed, no significant positional differences were found.

The number of possession of midfielders in the second zone of the field was significantly higher than the number of possession of defenders in the same zone (P<0,05). It can be thought that this may be because midfield players have the ball more frequently in the second zone in official competitions. One of the most important factors affecting the outcome of the competition in football is offensive (from defense to offense)

and defensive (from offense to defense) transitions (6, 18, 5). In particular, the main goal of offensive transitions is to gain numerical superiority in the opposition half by moving at high speeds (5). In this study, which examined the effect of transitions from defense to offense and from offense to defense in each zone of the game, no significant differences were found when the parameters of transitions were examined in all three zones (P>0,05).

As a result, when the various technical actions of the players in different positions in the three regions of the game are analyzed, although there are differences in some parameters, in general, positional differences in different regions do not show a significant change.

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