



## The effects of player substitutions on match winning performance in Turkish Super League

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### Abstract

During the soccer game, coaches have to make strategic decisions on player substitutions. Player substitutions made at the right time and with the right player can have a significant impact on winning the competition. The aim of this study is to investigate the effects of player substitutions in Turkish Super League competitions on match winning performance. The sample of the present study was composed of 100 matches randomly selected from the Turkish Professional Soccer League (Super League) during the 2020-2021 season. A total of 766 player substitutions made by the home and away teams in these competitions were analyzed according to the determined parameters. All the data obtained were given and interpreted as frequency and percentage values. As a result of the analyzes carried out, it was determined that the first player substitutions occurred mostly in the half-time and between 46-60 minutes of the competitions. It was found that the second player substitutions occurred mostly between the 61-75 minutes of the games. It has been observed that the third, fourth and fifth substitutions are mostly made between the 76-90 minutes of the matches. As a result, the fact that the coaches make more substitutions, especially between the 61-90 minutes of the matches, can be explained as the result of a strategy they apply to win the match by interfering with the game. In addition, coaches' substitutions time strategies can have an impact on the game tactics applied during the competition and final outcome in the match.

**Keywords:** Match winning, soccer, substitution

### *Türkiye Süper Ligi'nde yapılan oyuncu değişikliklerinin maç kazanma performansı üzerindeki etkileri*

#### Öz

Futbol maçı sırasında antrenörler, oyuncu değişimleri konusunda stratejik kararlar vermek zorundadır. Doğru zamanda ve doğru oyuncu ile yapılan oyuncu değişimlerinin yarışmayı kazanmada önemli bir etkisi olabilir. Bu çalışmanın amacı, Türkiye Süper Ligi müsabakalarındaki oyuncu değişimlerinin maç kazanma performansı üzerindeki etkilerini araştırmaktır. Bu çalışmanın örneklemini 2020-2021 sezonunda Türkiye Profesyonel Futbol Ligi'nden (Süper Lig) rastgele seçilen 100 maç oluşturmuştur. Bu müsabakalarda ev sahibi ve deplasman takımları tarafından yapılan toplam 766 oyuncu değişikliği belirlenen parametrelere göre analiz edilmiştir. Elde edilen tüm veriler, frekans ve yüzde değerleri olarak verilmiş ve yorumlanmıştır. Yapılan analizler sonucunda ilk oyuncu değişikliklerinin çoğunlukla müsabakanın devre arasında ve 46-60 dakikalar arasında yapıldığı tespit edilmiştir. İkinci oyuncu değişimlerinin çoğunlukla maçların 61-75 dakikaları arasında gerçekleştiği belirlenmiştir. Üçüncü, dördüncü ve beşinci oyuncu değişikliklerinin çoğunlukla müsabakaların 76-90 dakikalar arasında yapıldığı gözlemlenmiştir. Sonuç olarak antrenörlerin özellikle maçların 61-90 dakikası arasında daha fazla oyuncu değişikliği yapması, oyuna müdahale ederek maçı kazanmak için uyguladıkları bir stratejinin sonucu olarak açıklanabilir. Ayrıca, antrenörlerin oyuncu değişiklik zaman stratejileri, müsabaka sırasında uygulanan oyun taktikleri ve maçtaki nihai sonuç üzerinde etkili olabilir.

**Anahtar Kelimeler:** Maç kazanma, futbol, oyuncu değişikliği

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Genişletilmiş Türkçe Özet makalenin sonunda yer almaktadır.

## INTRODUCTION

The analysis of substitutions in football has been a research topic that has attracted the attention of researchers, especially in recent years. However, it has been determined that the literature on the subject is limited today (Hills et al., 2018). Many studies in this area has focused on changes in physiological parameters due to player substitutions (Padrón-Cabo et al., 2018; Liu et al., 2020).

Tactical decisions made by coaches in football competitions are of great importance in ensuring the sustainability and continuity of team play, in the ability of the team to organize itself, and in order to disrupt the balance and game strategy of the opposing team in the competition (Duarte et al., 2013; Martínez et al., 2022). However, many studies suggest that the main reason for substitution during a football game is to change a team's tactical demeanor (Del Corral et al., 2008; Bradley et al., 2014; Rey et al., 2015; Gomez et al., 2016; Martínez et al., 2022).

An effective substitution strategy contributes to the successful implementation of the team's tactical plan and can increase the efficiency of physical performance (Jankovic & Leontijevic, 2006; Carling et al., 2010; Bradley et al., 2014; Martínez et al., 2022). However, since there is no break in the game outside the half-time, soccer trainers have limited options to directly influence the course of the game (Myers, 2012).

Looking at the relevant literature, coaches tend to make more offensive players when teams in a losing position make the substitutions earlier than when teams are tied or ahead in the game. In addition, it was determined that the offensive players entered the game earlier and the defensive players later in the substitutions made during the match (Del Corral et al., 2008; Rey et al., 2015; Gomez et al., 2016). Regarding team performance, it has been reported that the inclusion of more attacking players in a team with substitutions made during the match results in an increase in the team's goal positions (Gomez et al., 2016). However, studies analyzing substitutions in a match from a tactical perspective are limited in the literature and more research is needed on this subject (Hills et al., 2018).

The coaches form their teams, taking into account the strengths and weaknesses of the opposing team before the match. During the competition, they tend to make substitutions according to the score of the match and the situation of the opponent. They also analyze the instantaneous positions that develop during the match and want to interfere with the game by

changing their team strategy. They do all this to win the match (Frick et al., 2010; Martínez et al., 2022).

In football, substitutions are made for different reasons such as injury, cards seen unnecessarily, excessive fatigue of the player or tactical reasons (Ascari & Gapnepein, 2006; Reilly et al., 2008; Frank, 2013). During a football match, an impactful substitution strategy can increase the effectiveness of a tactical plan, physical fitness and help in a positive outcome (Jankovic & Leontijevic, 2006; Carling et al., 2010; Bradley et al., 2014; Martínez et al., 2022). In football, coaches have an important role in winning the match. During the competition, the time of the substitution and the decision of which player remove-in and player out are very important. Substitutions can significantly affect teams' strategies and dynamics within the game due to a greater or lower collective synchronicity (Duarte et al., 2013).

In the related literatures' results showed that the match location (if the team is playing at home or away), and match status (i.e., if the team is losing, drawing or winning) were the key factors to be accounted for during the substitutions (Myers, 2012; Rey et al., 2015; Gomez et al., 2016).

Moreover, the interactive influence of contextual-related variables (match location, match status with final outcome) with match statistics was not considered in the previous research.

Therefore, in this study, it is aimed to reveal the factors that determine the substitution decisions, which is the most important tool used by the Turkish Super League coaches to make tactical changes during the match. For this, the player changes in the football matches played in the 2020-2021 season were examined and all the data obtained were analyzed and interpreted.

## **METHOD**

### **Sample**

The sample of the current research consists of 100 competitions randomly selected from the Turkish Professional Soccer League (Turkish Super League) during the 2020-2021 season.

### **Procedure**

In this study, the parameters related to the player substitutions which will be analyzed, were determined in accordance with the opinions of four football coaches who have UEFA Pro License certificate and at least 10 years of coaching experience (Gomez et al., 2016).

Then 100 competitions were analyzed in Turkish Super League. In the analyzes carried out, it was determined that a total of 766 player substitutions were made during the

competitions. In the analyzed competitions, substitutions made by both the home and away teams were taken into account.

These substitutions were analyzed according to the following parameters;

- Substitution minute
- Substitution number
- Playing position of player in and player out
- The effect of the match score

In order to avoid confounding factors during player's substitutions, the matches that included a player dismissal (red card); or an injury were excluded from the final sample.

#### **Collection of data**

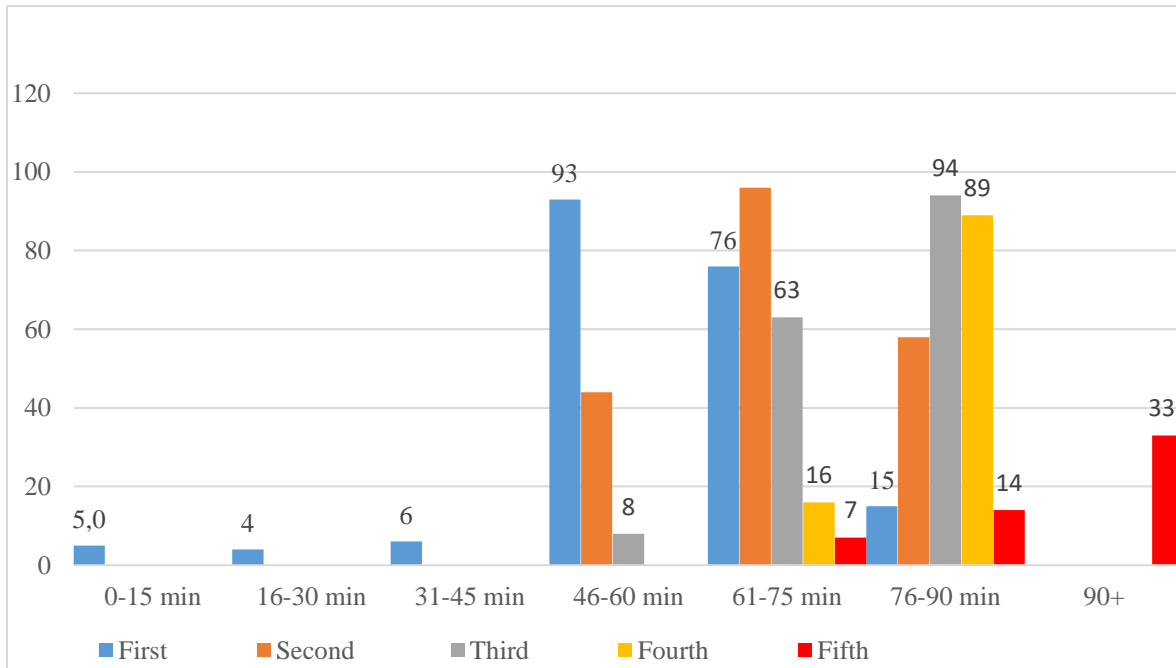
All data was obtained from the [www.whoscored.com](http://www.whoscored.com) website. The data source of the website is the OPTA Sportsdata company. In the study, the reliability of the company's tracking system, from which the data used for analysis were obtained was found as reliable (Liu et al., 2013).

#### **Statistical analysis**

In this study, mean, standard deviation and frequencies were used for data such as the minutes of the substitutions, the playing positions of players in and players out, the effect of the match score and the number of substitutions. All obtained data are given as frequency and percentage values and interpreted. In addition, substitution minutes, number of substitution, match status and substitution improvements were performed using crosstabs commands.

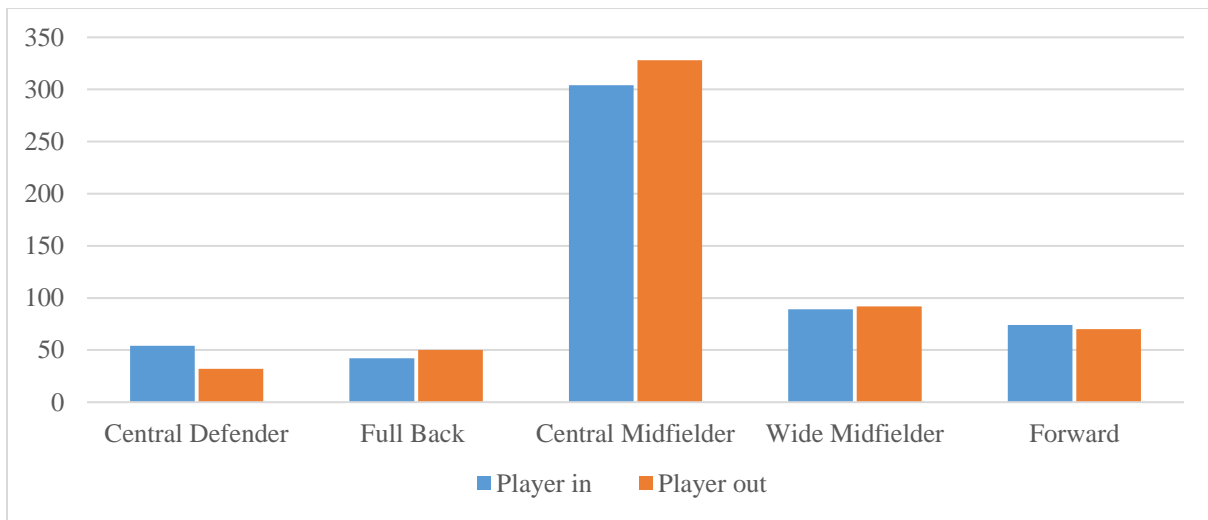
### **RESULTS**

The graph of the time intervals of the substitutions made during the matches in football is shown in Figure 1. As a result of the analysis, it was determined that the first substitutions were made mostly between the half-time of the matches and between 46-60 minutes. It has been determined that second substitutions are made more frequently between the 61-75 minutes of the matches. It has been observed that the third, fourth and fifth substitutions are mostly made between the 76-90 minutes of the matches.



**Figure 1. Time frames graph of substitutions made**

The positions of the player in and player out are shown in Figure 2. It has been determined that the coaches changed the central midfielders' players more often during the matches. In addition, it was determined that after the central midfielders, the most substitutions were made with the wing and forward players. But it was observed that the coaches changed the players playing in the center of the defense less often.



**Figure 2. Positions of player in and player out during the game**

**Table 1. Minutes when the substitution occur according to match status and match location**

Match location (if the team is playing at home or away), / Substitution number	Match status		
	Losing $\bar{x} \pm Sd$	Drawing $\bar{x} \pm Sd$	Winning $\bar{x} \pm Sd$
<b>Home team</b>			
1	51.58 ± 10.10	55.44 ± 16.16	64.63 ± 10.89
2	60.93 ± 12.53	69.03 ± 10.80	73.39 ± 10.42
3	73.53 ± 10.02	78.92 ± 7.98	81.78 ± 7.60
4	82.20 ± 8.00	84.63 ± 8.05	84.72 ± 6.28
5	78.71 ± 9.58	79.66 ± 9.13	86.92 ± 5.25
<b>Away Team</b>			
1	53.21 ± 11.05	51.78 ± 16.09	65.00 ± 14.62
2	63.43 ± 12.31	67.29 ± 11.71	76.58 ± 7.60
3	70.76 ± 9.32	78.60 ± 11.10	84.51 ± 6.75
4	77.38 ± 7.11	86.94 ± 6.89	85.83 ± 5.04
5	80.41 ± 4.75	83.50 ± 6.46	87.75 ± 3.88

Table 1 shows mean and standard deviation values for substitutions based on the score of the match (win, draw and loss) and the match location (away and home team). The results of the analysis reveal that the coaches change more players during the match when their teams are defeated than if they are in a draw or a winner. In addition, it has been determined that the home teams have made player substitutions earlier compared to the away teams.

**Table 2. Relationships between substitution minute periods, number of substitution and match status with final outcome**

Match status	Losing					Drawing					Winning				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
0-45 min															
46-50 min															
51-55 min	↑														
56-60 min	↑	↑		↑											
61-65 min		↑						↓			↓				
66-70 min	↑						↑								↑
71-75 min			↑											↓	
76-80 min	=						=	↑	=	=		↓			=
81-85 min		=		=	↑				↑		↑			=	
86-90 min			=		=			↓	↓		=	↓			
Aggregate															

↑: improved performance after the substitution, ↓: decreased performance after the substitution, =: similar performance after the substitution

Table 2 shows the relationships between substitution minute periods, number of substitution and match status with final outcome. The results reveals that when the teams were losing and made their substitutions, the minute periods that were related to increased

performances (i.e., from losing to drawing) were 51 to 60 min during the first substitution, the minutes 61 to 70 during the second substitution and the minutes 71 to 85 min during the third and fourth substitution.

When the teams were drawing the relationships between substitution minute period and final outcome were only significant during the second substitution with performance decrements if the substitution was made in the 66-70 min period, and similar performance if the third substitution was made in the 76- 80 min period. Lastly, when the teams made the substitution with a winning match status, the minute periods that were related to increased performance were 81 to 85 min during the first substitution, and the minutes 66 to 70 during the fourth substitution.

## **DISCUSSION AND CONCLUSION**

The purpose of this research was to examine the effects of player substitutions on the match-winning performance of the teams.

The International Football Association Board (IFAB) adopted the rule allowing teams to make five substitutions in professional football matches, which was initiated on 8 May 2020 and subsequently extended until 31 December 2022. This rule is still applied in today's football. Therefore, the matches analyzed in our study include five substitutions. In addition, when the literature on the subject was examined, it was determined that the previous studies included three substitutions. For this reason, it can be said that the findings of the previous studies and the findings of the current study will not overlap with each other on some parameters. The reason for this statement is that the different number of substitutions rule may allow the coach to follow different methods in terms of tactical strategy and make substitutions at different times. For this reason, the parameters related to the number of substitutions in future studies within the scope of the new substitution rule will contribute and inform the coaches more.

As a result of the analyzes made in the current study, it was determined that the first substitutions took place mostly between the half-time of the matches and between 46-60 minutes. It has been determined that second substitutions are made more frequently between the 61-75 minutes of the matches. It has been observed that the third, fourth and fifth substitutions are mostly made between the 76-90 minutes of the matches. According to these results, the fact that the coaches make more substitutions, especially between the 61-90 minutes of the matches, can be explained as the result of a strategy they apply to win the match by interfering with the game. In addition, the coaches' substitution time strategies can have an

impact on the game tactics applied during the match and the match outcome. These findings are similar to those provided by recent literature within this area (Jankovic & Leontijevic, 2006; Del Corral et al., 2008; Bradley et al., 2014; Rey et al., 2015; Gomez et al, 2016).

In a study conducted by Dogan et al. (2021), the player substitution times during the matches of a football team throughout the season were examined. According to the findings of the study, it was determined that the number of substitutions took place in the second half of the competitions, especially between the 76th and 90th minutes. The reason for this is explained as the higher number of goals scored and conceded by the analyzed team occurred between 76 and 90 minutes.

According to the findings of the present study, it has been determined that the coaches replace the central midfielders more frequently during the matches. Similarly, Gomez et al. (2016), it was reported that coaches make substitutions mostly with central midfielders throughout the match. The reason of this may be midfielders covered more distances and experienced the fatigue during the game. In addition, it was determined that after the central midfielders, the most substitutions were made with the wing and forward players. It has been observed that the coaches do not change the players playing in the center of the defense much. Because these players are able to maintain their fitness level throughout the match.

In addition, it was determined that the coaches made player substitutions more than if their teams were defeated during the match, compared to whether they were drawn or won. In addition, it has been determined that the home teams have made player substitutions before compared to the away teams. Del Corral et al. (2008) and Gomez et al. (2016), the findings of a similar study are like the results of the current research.

The findings of the studies in the literature support the view that the game tactics applied during the match and the result of the match are affected by the coaches' substitution time strategies. (Hirotsu & Wright, 2002; Jankovic & Leontijevic, 2006; Hirotsu et al., 2006; Myers, 2012; Bradley et al., 2014; Martínez et al., 2022).

Myers (2012) analyzed the effect of substitutions on the result of the competition in her study. The study findings reveal that if the substitution team is defeated, the 1st, 2nd and 3rd substitutions are made during the 58th, 73rd and 79th minutes, respectively. While the success rate of the teams that usually make the substitutions at these minutes is 42.27%, the success rate of the teams that do not comply with this rule and make the substitutions at different times of



the match is 20.52%. In the same study, it was determined that when the teams were defeated, they made substitutions before, according to their draw and win situations.

In another similar study, it was determined that the coaches made substitutions more prominent in the game when their teams were defeated than when they were drawn or won (Gomez et al., 2016). These findings are like the findings of the current study.

Rey et al. (2015), 677 player substitutions made in 124 matches played in the UEFA Champions League in the 2013-2014 football season were analyzed. The study findings revealed that the quality of the opponent team affects the game change strategies of the coaches. It has been determined that while the coaches primarily prefer defensive players in substitutions in matches played with stronger teams, they prefer more offensive players in matches played with weaker teams. Researchers have reported that the quality of the opposing team in the match (the higher or lower ranked team in the points ranking) and the score situation during the match (win, draw or lose) are key factors that should be considered as a priority when examining the substitution strategies of the coaches. In the same study, it was reported that the coaches of the teams that lost during the match made their first, second and third substitutions before 53, 71 and 80 minutes, respectively. In another similar study, it was reported that the coach of a team that was defeated during the match generally preferred to make the first, second and third substitutions at the 58th, 73rd and 79th minutes in order to switch the course of the game and have a positive effect (Myers, 2012).

In addition, the findings of some studies in the literature showed that the away team's first and second substitutions have a decreased impact on the percentage of possession between the teams facing each other. This can be explained by the changes in tactics and the style of play adopted by the team after the player substitutions (Gomez et al., 2016). One of the major purposes of substitution in football is to adapt the teams to the situations that develop during the game (Del Corral et al., 2008).

These results are consistent with the present study, as substitutions made by losing teams during the match between the 58th and 70th minutes are associated with improved or positive performance. On the other hand, substitutions are recommended to be made only after the 85th minute or not at all when a team takes the lead during the match. Furthermore, there is no specific recommendation that can be given to coaches regarding substitutions when the game remains tied during the match.

Coaches try to control the game by making substitutions at the right time to increase the physical performance of their team and the effectiveness of a tactical plan during the competition (Bradley et al., 2014; Martínez et al., 2022). However, it cannot be said that the substitutions made are always successful in increasing the physical performance of the team and the effectiveness of the tactical plan. Because every football match is different. Therefore, all possible variables and performance indicators (ball possession, goal scored, etc.) during the match can influence substitution periods and strategies.

In addition, previous studies on this topic have not examined whether or to what extent performance indicators such as possession, ball possession, or the difference between shots on goal change before and after substitutions. This approach is particularly important in football, where evaluating offensive and defensive play based on goals scored sometimes fails to provide a complete understanding of a team's performance after substitution (Lago et al., 2012).

In a study conducted by Del Corral et al. (2008), the effect of substitutions on the performance of the team in the matches played in the Spanish First League in the 2004-2005 football season was examined. The researchers concluded that the most important reason for the first substitution was the current score during the match. In addition, it was determined that the defensive players were changed less than the attacking players. In addition, it was determined that the home teams made more substitutions than the away teams during the half-time.

In the substitution analysis study conducted by Celik (2020), it was determined that the home team coaches preferred to make the substitutions at half time instead of the second half of the matches due to the reaction and pressure of the audience. During the match, it was determined that the coach of the winning team postponed the decision of the first substitution, while the coach of the defeated team made the first substitution earlier. It has been reported that the coach of the losing team made the first substitution earlier, while the coach of the winning team made the first substitution later as the difference in score increased during the match. It is observed that these results are compatible with the findings of Del Corral et al., (2006). In addition, the findings of the current study are supported by the findings of the above studies. The relatively small sample size of the present study is a limitation of the study. There is a need for studies with larger sample sizes on the subject in the future.

This study was conducted to examine the effects of substitutions in Turkish Super League competitions on match-winning performance. The results of study showed that the first

substitutions occur mostly between the half-time of the matches and between 46-60 minutes. It was observed that the second substitutions were made between 61-75 minutes of the matches, and the third, fourth and fifth substitutions were made more frequently between the 76-90 minutes of the matches. According to these results, the fact that the coaches make more substitutions, especially between the 61-90 minutes of the matches, can be explained as the result of a strategy they apply to win the match by interfering with the game. In addition, the coaches' substitution time strategies can have an impact on the game tactics applied during the match and the match final outcome. However, given the relatively small sample size of the current study, future studies should confirm these results.

As a result, it is recommended that coaches make player substitutions later when their team is ahead in terms of score and earlier when they are behind in terms of score during the game. In addition, there is no specific suggestion that can be given to the coaches by substitution if the match continues in a draw during the match.

## GENİŞLETİLMİŞ ÖZET

### GİRİŞ

Futbol müsabakalarında teknik adamların verdiği taktiksel kararlar, takım oyununun sürdürülebilirliğini ve devamlılığını sağlamada, takımın kendi kendini organize olabileceği yeteneğinde ve müsabakada karşı takımın dengesini ve oyun stratejisini bozmak amacıyla yapıldığı için çok büyük öneme sahiptir (Duarte ve ark., 2013; Martínez ve ark., 2022). Bununla birlikte, birçok çalışma, bir futbol maçı sırasında oyuncu değişikliği yapmanın ana nedeninin, bir takımın taktik davranışını değiştirmek olduğunu ileri sürmektedir (Rey ve ark., 2015; Gomez ve ark., 2016; Martínez ve ark., 2022). Etkili bir oyuncu değişikliği stratejisi, takımın taktik planının başarılı şekilde uygulanmasına katkıda bulunur ve fiziksel performansın verimliliğini artırabilir (Bradley ve ark., 2014; Martínez ve ark., 2022). Ancak devre arası dışında oyunda ara olmadığı için teknik adamların maçın gidişatını doğrudan etkilemek için sınırlı fırsatları bulunmaktadır (Myers, 2012). Futbolda oyuncu değişiklikleri, sakatlık, gereksiz yere görülen kartlar, oyuncunun aşırı yorulması ve oyundan düşmesi veya taktiksel sebepler gibi farklı nedenlerden dolayı yapılmaktadır (Ascari & Gapnepein, 2006; Reilly ve ark., 2008; Frank, 2013). Müsabaka sırasında, oyuncu değişikliğinin zamanlaması ve hangi oyuncunun oyundan çıkıp hangi oyuncunun oyuna dâhil olacağı kararı müsabakanın sonucu açısından oldukça önemlidir. Bu çalışma, 2020/2021 futbol sezonunda oynanan Türkiye Süper Lig müsabakalarında yapılan oyuncu değişikliklerinin, takımların maç kazanma performansı üzerindeki etkilerini incelemeyi amaçlamıştır.

### YÖNTEM

Araştırma örneklemini, 2020/2021 sezonunda Türkiye Profesyonel Futbol Süper Ligi'nden rastgele seçilen 100 futbol müsabakası oluşturmuştur.

Toplam 766 oyuncu değişikliğinin yapıldığı müsabakalar; yapılan oyuncu değişikliklerinin zaman aralıkları, oyuna giren ve çıkan oyuncuların mevkileri, müsabaka skorunun etkisi ve oyuncu değişiklik sırası gibi parametreler dikkate alınarak analiz edilmiştir.

Aynı anda iki ve daha fazla oyuncu değişikliğinin yapıldığı durumlar analiz dışı bırakılmıştır. Ayrıca, müsabakalar sırasında yapılan oyuncu değişiklikleri sırasında oyuncunun oyundan çıkmak zorunda kaldığı (kırmızı kart, sakatlık vs.) durumlar değerlendirmeye alınmamıştır. Tüm veriler [www.whoscored.com](http://www.whoscored.com) web sitesinden elde edilmiştir. Bu çalışmada, yapılan oyuncu değişikliklerinin zaman aralıkları, oyuna giren ve çıkan oyuncuların mevkileri, müsabaka skorunun etkisi ve oyuncu değişiklik sırası gibi veriler için tanımlayıcı istatistikler (ortalama, standart sapma ve frekanslar) kullanılmıştır. Ayrıca, her bir oyuncu değişikliğinin (birinci, ikinci, üçüncü, dördüncü ve beşinci) yapıldığı dakika periyodu (ilk devre ve ikinci devredeki her 15 dakikalık periyotlar), maç durumu (kazanma, berabere kalma ve kaybetme) ve oyuncu değişiklikleri ve müsabaka kazanma arasındaki ilişki, çapraz tablo komutları kullanılarak gerçekleştirilmiştir.

## **BULGULAR**

Yapılan analizler neticesinde, ilk oyuncu değişikliklerinin daha çok müsabakaların devre arasında ve 46-60 dakikalar arasında gerçekleştiği belirlenmiştir. İkinci oyuncu değişikliklerinin müsabakaların 61-75 dakikalar arasında daha fazla sayıda yapıldıkları tespit edilmiştir. Üçüncü, dördüncü ve beşinci oyuncu değişiklikleri ise daha çok müsabakaların 76-90 dakikalar arasında yapıldıkları gözlemlenmiştir. Bunun yanında, antrenörlerin müsabakalar sırasında, merkezi orta saha oyuncularını daha fazla sayıda değiştirdikleri tespit edilmiştir. Ayrıca, merkezi orta saha oyuncularından sonra en fazla oyuncu değişikliklerinin kanat ve forvet oyuncularıyla yapıldıkları belirlenmiştir. Ayrıca, antrenörlerin müsabaka sırasında takımları mağlup durumdayken, beraberlik ya da galip olma durumlarına göre daha fazla sayıda oyuncu değiştirdikleri, ev sahibi takımlarının deplasman takımlarına göre oyuncu değişikliklerini daha erken yaptıkları belirlenmiştir. Bunun yanında, teknik direktörler tarafından müsabakanın sonlarında yapılan oyuncu değişikliklerinin skora etki etme amacından ziyade skoru korumak amacıyla vakit geçirmeye yönelik değişiklikler olduğu belirlenmiştir. Teknik adamların müsabakanın sonlarına doğru yaptıkları dördüncü ve beşinci oyuncu değişikliklerinin bu amaç doğrultusunda yapıldıkları tespit edilmiştir.

## **TARTIŞMA VE SONUÇ**

Yapılan çalışmanın bulguları, antrenörlerin müsabaka sırasında ilk oyuncu değişikliklerini devre arasında ve 46-60 dakikalar arasında, ikinci oyuncu değişikliklerini 61-75 dakikalar arasında, üçüncü, dördüncü ve beşinci oyuncu değişiklikleri ise daha çok müsabakaların 76-90 dakikalar arasında yapmayı tercih ettiklerini ortaya koymaktadır. Ayrıca ilk değişiklikten sonra yapılan diğer oyuncu değişikliklerinin müsabakaların daha çok 61.ci dakika ve sonrasında yapıldıkları belirlenmiştir. Bu durum, antrenörlerin müsabaka sırasında bazı oyuncuların yorgunluk yaşaması, bazılarının sarı kartı

olması, müsabakanın skoruna göre taktik değişiklik yapma isteği gibi durumlar açısından oyuna müdahale ederek müsabakayı kazanma için uyguladıkları bir stratejinin sonucu olarak açıklanabilir.

Bunun yanında, antrenörlerin müsabakalar sırasında, merkezi orta saha oyuncularını daha fazla sayıda değiştirdikleri belirlenmiştir. Ayrıca, merkezi orta saha oyuncularından sonra en fazla oyuncu değişikliklerinin kanat ve forvet oyuncularıyla yapıldıkları tespit edilmiştir.

Konuyla ilgili literatür incelendiğinde, yapılan benzer çalışmaların sınırlı sayıda oldukları tespit edilmiştir. Literatürde yapılan çalışmaların bulgularının mevcut çalışmanın bulgularıyla benzerlik gösterdikleri belirlenmiştir.

Gomez ve arkadaşları (2016) tarafından yapılan bir çalışmada, antrenörlerin müsabaka boyunca oyuncu değişikliklerini daha çok merkezi orta saha oyuncularıyla yaptıkları rapor edilmiştir. Bunun yanında, antrenörlerin müsabaka sırasında kendi takımları mağlup durumdayken, beraberlik ya da galip olma durumlarına göre daha fazla sayıda oyuncu değiştirdikleri tespit edilmiştir. Ayrıca ev sahibi takımlarının deplasman takımlarına göre oyuncu değişikliklerini daha erken yaptıkları belirlenmiştir. Del Corral ve arkadaşları (2008) ve Gomez ve arkadaşları (2016) tarafından yapılan benzer bir çalışmanın bulguları, mevcut çalışmanın bulgularıyla benzerlik göstermektedir. Literatürde konuyla ilgili çalışmaların bulguları, müsabaka sırasında uygulanan oyun taktikleri ve müsabaka final sonucunun, antrenörlerin oyuncu değişiklik zaman stratejilerinden etkilendiği görüşünü desteklemektedir. (Hirotso & Wright, 2002; Janković & Leontijević, 2006; Hirotso ve ark., 2006; Myers, 2012; Bradley ve ark., 2014; Martínez ve ark., 2022). Mevcut çalışmanın nispeten küçük örneklem büyüklüğü, çalışmanın sınırlılıklarındandır.

Sonuç olarak, antrenörlerin müsabaka sırasında takımları skor olarak öne geçtiğinde, oyuncu değişikliklerini daha geç, skor olarak geriye düştüklerinde ise daha erken yapmaları önerilmektedir. Ayrıca, müsabaka sırasında maç berabere devam ediyorsa, antrenörlere oyuncu değişikliği ile verilebilecek spesifik bir öneri de bulunmamaktadır.

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<b>KATKI ORANI</b> <b>CONTRIBUTION RATE</b>	<b>AÇIKLAMA</b> <b>EXPLANATION</b>	<b>KATKIDA BULUNANLAR</b> <b>CONTRIBUTORS</b>
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Tasarım <i>Design</i>	Yöntem ve arařtırma desenini tasarlamak <i>To design the method and research design.</i>	Halit EGESoy Hayrettin GÜMÜřDAĐ
Literatür Tarama <i>Literature Review</i>	Çalıřma için gerekli literatürü taramak <i>Review the literature required for the study</i>	Halit EGESoy Hayrettin GÜMÜřDAĐ Ebubekir Mertcan CİMBILAZ Yavuz İhsan KILIÇ
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Tartıřma ve Yorum <i>Discussion and Commentary</i>	Elde edilen bulguların deđerlendirilmesi <i>Evaluation of the obtained finding</i>	Halit EGESoy Hayrettin GÜMÜřDAĐ Ebubekir Mertcan CİMBILAZ Yavuz İhsan KILIÇ

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*This study was conducted with the decision of Pamukkale University Non-Interventional Clinical Research Ethics Committee dated 07.01.2023 and numbered E-60116787-020-328714.*



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