Original Article

2016 UEFA European Championship: Pass and shot association

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ABSTRACT

The purpose of this study is to analyze the association between technical features such as goal, pass, shot, ball possession and ball stealing, and the goals scored in matches played by teams who qualified out of the group (n=16) and who could not (n=8) in 2016 UEFA European Championship. The data of the study were obtained by using computerized multiple camera surveillance system (Prozone). SPSS 22.0 program was used for the statistical analyses of this study. Independent T test was used to compare the parameters of teams who qualified out of the team and those who could not, while Pearson correlation analysis was used to analyze the association between variables. When the total shot parameters per match apart from shots, total pass, total pass to the third zone and ball stealing total data were compared, significant difference was found (p<0.05). In all of the shot parameters, especially in total goals scored and total shots on target (r=0.903), a positive high association was found in total ball stealing (r=0.796), total pass (r=0.753), total forward pass (r=0.819) and total pass to the third zone (r=0.748), while a negative intermediate association was found in average pass length per match (34+M) (r=-0.449). When the results were examined, it can be said that the teams who qualified out of the game can use technical properties effectively. It can be stated that in order to be successful in elite tournaments in the world, analysis practices should be taken more into consideration as well as technical and tactical practices. **Key words:** PERFORMANCE ANALYSIS, FOOTBALL, GOAL.

INTRODUCTION

Success in football, which is certainly the most popular sport branch of the world, requires top level technical, tactical and physical skills and football is one of the sport branches which includes uncertainty the most (Manna, Khanna, & Dhara, 2011). The money spent in football and sponsorship competitions increased the interest in this sector and turned it into an ever-increasing industry, such that football world updates the equipment used in trainings and competitions with developing technology so that success can become permanent. Match analysis, which is the most important tool for technical and tactical moves are objective records which examine physical and technical events that occur during a competition. The first target of match analysis is to put forward the strong and weak points that a team has (Tenga & Sigmundstad, 2011). When a coach analyzes interprets the results that he obtains well, he can designate his personal decisions and training model by getting information about the performance of the footballer and the team (Mitrotasios & Armatas, 2014).

After a match, the most discussed issue is the goals missed and conceded by a team rather than the football played by the team. To reach the formula of winning the match, assessing the analysis of organizations in attack and pass, shot, ball possession and ball stealing data together will help to develop the most suitable strategy (Mitrotasios & Armatas, 2014). In football matches, approximately 80% of goals scored results from 3 or more consecutive passes and from one out of every 10 passes (Hughes & Franks, 2005). However, some data such as high levels of ball possession, too many goal-scoring opportunities, shots on target or corners are not always valid rules to show a good performance and to reach success in football. A football team can win a competition or a tournament despite showing a bad performance (Wright, Atkins, Polman, Jones, & Sargeson, 2011).

Although there are researches in literature about the physical and physiological characteristics of football players, there are limited numbers of studies about the performance analysis of football teams (Carling, 2010; Njororai, 2013; James, Mellalieu, & Taylor, 2004; Erdil, Bozkurt, İşleğen, & Ölçücü, 2013). Within this context, the purpose of this study is to find out the effects of technical features such as pass, shot, ball possession and ball stealing, and the goals scored in matches played by teams who participated in 2016 UEFA European Championship and to compare these features in terms of the state of qualifying out of the group.

METHODS

Teams and Match data
This study analyzed the shot, pass and ball possession parameters of a total of national teams of 24 countries, 16 teams who qualified for the last 16 tour (n= 16) and who did not (n=8), in group matches of 2016 UEFA European Championship. A total of 108 goals were scored in the championship. 8 goals scored from penalty were not assessed. The teams who qualified out of the group scored 97 goals, while those who did not scored 11 goals.

Data collection and analysis
The data of the study were obtained by using computerized multiple camera surveillance system (ProzoneSport Ltd©, Leeds, UK) (Bradley, O'Donoghue, Wooster, & Tordoff, 2007; Di Salvo, Collins, McNeill, & Cardinale, 2006).

Statistical analysis

The statistical analysis of the data was conducted by using SPSS 22.0 statistic program (SPSS Inc., Chicago, Illinois, ABD). Before statistical analysis, Shapiro-Wilk test was conducted to check normal distribution. Skewness and Kurtosis values were checked for data sets which did not show normal distribution. Independent t test was used to compare the data of the teams who qualified and who could not, while Pearson correlation was used for the association between data. Statistical results were assessed at a significance level of p<0.05.

RESULTS

Table 1. Shot variables of teams who could qualify out of the group and those who could not.

Variable	Group	N	Mean	S.D.	t	p
Total shots	A	16	69.44	31.17	3.279	**0.003**
	B	8	32.50	6.72		
Total shots on target	A	16	25.56	11.95	3.689	**0.001**
	B	8	9.38	4.10		
Total shot on target per match	A	16	5.09	1.56	3.012	**0.006**
	B	8	3.13	1.38		
Shot on target percentage (%)	A	16	37.88	9.89	2.125	**0.045**
	B	8	28.38	11.20		
Average shots per match	A	16	13.96	4.53	1.835	0.080
	B	8	10.83	2.25		

Teams who qualified out of the group (A) Those who could not (B)

In terms of the state of qualifying out of the group, statistical difference was found in all variables except average shots per match (Table 1).

Table 2. Results of correlation between shots and goals.

Variable	Total goals scored		
	N	R	p
Total shots	24	0.792	**<0.001**
Total shots on target	24	0.903	**<0.001**
Total shot on target per match	24	0.465	**0.020**
Average shots on target per match	24	0.714	**<0.001**
Shot on target percentage (%)	24	0.413	**0.040**

Table 2 shows correlation analysis results between shots and goals scored.

Table 3. Pass variables of teams who could qualify out of the group and those who could not.

Variable	Group	N	Mean	S.D.	t	p
Number of average passes per match	A	16	484.77	117.61	1.095	0.285
	B	8	435.91	61.22		
Total passes	A	16	2394.38	902.09	4.630	**<0.001**
	B	8	1307.75	183.59		
Successful passes (%)	A	16	80.29	7.23	1.079	0.292
	B	8	77.34	3.64		
Total passes forward	A	16	597.61	314.74	0.838	0.411
	B	8	502.88	41.53		
Average total passes forward per match	A	16	170.50	23.81	0.314	0.757
	B	8	167.63	13.91		
Successful forward passes %	A	16	65.58	10.15	1.196	0.244
	B	8	61.16	2.79		
Total passes to the third zone	A	16	319.63	108.82	3.211	**0.004**
	B	8	192.75	28.17		
Passes to the third zone per match	A	16	65.13	13.52	0.187	0.854
	B	8	64.13	9.45		
Successful passes to the third zone %	A	16	61.58	14.50	0.911	0.372
	B	8	56.65	6.27		
Average successful pass length per match (0-17)	A	16	263.31	76.82	1.202	0.242
	B	8	229.38	26.78		
Pass Length success (0-17) (%)	A	16	84.01	5.47	1.097	0.285
	B	8	81.55	4.48		
Average successful pass length per match (17-34)	A	16	165.06	46.13	1.138	0.268
	B	8	143.88	35.44		
Pass Length success (17-34) (%)	A	16	85.02	5.53	0.954	0.350
	B	8	82.99	3.24		
Average successful pass length per match (34+M)	A	16	55.44	5.37	-2.190	0.390
	B	8	62.00	9.43		
Pass Length success (34+M) (%)	A	16	53.58	10.25	0.971	0.342
	B	8	49.69	6.62		

In the analysis conducted on passes, which are important data in football, only the values of total pass and total pass to the third zone were found to be significant (Table 3).

Table 4. Results of correlation between goals and passes.

Variable	Total goals scored		
	N	R	p
Total passes	24	0.753	**<0.001**
Number of average passes per match	24	0.267	0.200
Successful passes (%)	24	0.329	0.110
Total passes forward	24	0.819	**<0.001**
Average forward passes per match	24	0.115	0.590
Successful forward passes (%)	24	0.415	**0.040**
Total passes to the third zone	24	0.748	**<0.001**
Average passes to the third zone per match	24	0.103	0.630
Successful passes to the third zone (%)	24	0.336	0.100
Average successful pass length per match (0-17)	24	0.275	0.190
Pass length success (0-17) (%)	24	0.299	0.150
Average successful pass length per match (17-34)	24	0.298	0.150
Pass length success (17-34) (%)	24	0.241	0.250
Average successful pass length per match (34+M)	24	-0.449	**0.020**
Pass length success (34+M) (%)	24	0.337	0.100

In the correlation conducted between pass and goal, a positive high ($p<0.01$) association was found between total number of passes, total passes forward and passes to the third zone, while negative intermediate association was found between average pass length per match 34+ meters and goal ($p<0.01$) (Table 4).

Table 5. Ball possession and ball stealing variables of teams who could qualify out of the group and those who could not.

Variable	Group	N	Mean	S.D.	t	p
Ball possession (%)	A	16	50.08	8.04	0.465	0.646
	B	8	48.63	4.93		
Ball possession in the first half (%)	A	16	50.42	8.26	0.844	0.408
	B	8	47.68	5.59		

Ball possession in the second half (%)	A	16	49.77	8.08	0.026	0.979
	B	8	49.69	4.62		
Total ball stealing	A	16	108.50	34.53	3.855	**0.010**
	B	8	58.88	14.93		

Table 6. The association between ball possession, ball stealing and goal.

Variable			Total goals scored	
		N	R	p
Ball possession (%)		24	0.118	0.291
Total ball stealing		24	0.796	**<0.001**
	Goals scored in the first half		**Goals scored in the second half**	
	R	p	R	p
Ball possession in the first half (%)	0.170	0.420		
Ball possession in the second half (%)			-0.066	0.760

A high association was found between stealing ball from the opponent and goal (Table6).

DISCUSSION AND CONCLUSIONS

In football, which is a sport large masses of people go after, performance of football players and the development of football will be positively influenced with the application of goal-oriented conscious and effective practices of factors influencing success. Through the definitions and classifications of all technical moves, it will be possible to make an association between the result of the game and the elements of the game (Loy, 1995).

The results of this study showed that total shot (p<0.003), total shots on target (p<0.001), average shots on target per game (p<0.006), percentage of shots on target (p<0.045), total pass (p<0.001) and total pass to the third zone (p<0.004) were found to have a significant effect on the teams' success. In addition, when the teams' values about shots were analyzed, significant association was found between all variables and goal, with the highest correlation being in total shot on target parameter (r=0.903). One of the factors determining victory and defeat during a competition is the shots on goal. It is a known fact that especially teams who have talented feet plan shot-specific tactics and technical authorities give such players a privilege to use that talent in every moment of the game. There are a great number of studies in national and international studies which support the results of our study (Sajadi & Rahnama, 2007; Bostancı, Ünver, Kabadayı, Şebin, & İmamoğlu, 2017; Erdil et al., 2013; Yiannis, 2014).

According to studies conducted, it was observed that the winners of 2006 World Cup had more shots on goal per match (11.1) (Sajadi & Rahnama, 2007), while 2010 World Cup Champion Spain national team (15.25) played with a higher average of shots when compared with other teams (6.75) (Erdil et al., 2013). In the matches of both world cups aforementioned, average shots on goal per match were found to increase by years. When these parameters are considered, it can be said that the most important technical action of successful teams becomes shots in time. Especially recently, it can be said that weaker teams lay more emphasis on defense strategies in their game plans and thus narrow down their game zone. Thus, it can be said that this situation causes an obvious increase in the shot numbers in narrow zone games. The results of these two studies are in parallel with the results of our study.

In football, passes to possess more ball than the opponent and using this efficiently is a situation most teams cannot be up to. Passes in effective areas are important in determining the results of the game (Scoulding, James, & Taylor, 2004). In this study, when the pass variables of the teams who could qualify out of the group and those who could not were analyzed, significant difference was found in total pass value and the total pass value to the third zone. In addition, it was also found that the teams who qualified for an upper tour had more passes (Tablo 3). Collet (2013) mentioned a significant association between team success and pass. It was concluded that the most successful teams in 2010 FIFA world cup had more passes per match when compared with other teams (Erdil et al., 2013; Clemente, 2012). Studies conducted have shown that especially in the three big leagues (England, Spain, Germany) and in the most important international tournaments, successful teams have more possession of the ball (Jones, 2004; James et al., 2004; Bradley et al., 2013; Parziale & Yates, 2013; Araya & Larkin, 2013; Lago & Martin, 2007; Vogelbein, Nopp, & Hokelmann, 2014; Castellano, Casamichana, & Lago, 2012; Ridgewell, 2011). The results of the present study are in parallel with the results in literature. More accurate passes in teams made up of players with high technical skills can have direct effects on the success of the team. Although being successful in today's football depends on offensive game and ball possession, these key factors may not always be valid to reach success. Besides ball possession, using the ball positively and transferring the ball to the third zone in a fast and effective way also influence success.

For goal, which is an indicator of winning and losing, teams first of all have to possess the ball and use it effectively. In addition, repossession of the lost ball in the second and third zones can have a direct influence on the result. In this study, a high significant association was found between stealing ball from the opponent and goal (r=0.796).

No significant difference was found between the pass length (0-17m-34m-34m+) variables of the teams who could qualify out of the group and those who could not (p>0.05). On the other hand, it was found that the probability of goal decreased as the number of 34 m and longer passes increased (r=-449). In the goal and pass length analysis of 2012 European Championship, it was found that the most number of goals were scored with passes longer than 10 m (18.4%), while this rate decreased to 17.1% with passes shorter than 10 m (p<0.05) (Michaildis, Michaildis C, & Primpa, 2013). In 2017 World Cup, goals were scored with a rate of 22.2% from passes between 10-24 m. (Yiannis, 2014). When the literature is reviewed, the results are not in parallel with the present study. In 2016 European Championship, the zones pass was made from, ball possession and passes on shot per match were found to come to the forefront rather than the length of passes.

As a conclusion, the results of the study showed that shots, passes and ball possession have an influence on goal and there is clearly a significant association between them. In addition, the fact that the teams who qualified to get out of the group effectively performed the necessities of today's football understanding

mentioned above played an important role in their success. From this point of view, it can be recommended that to reach success in modern football, average number of passes per match and number of shots on goal should be increased and special trainings should be conducted especially to steal ball from the opponent in the third zone.

REFERENCES

Araya, J. A., & Larkin, P. (2013). Key performance variables between the top 10 and bottom 10 teams in the English Premier League 2012/13 season. Human Movement, Health and Coach Education (HMHCE), 2, 17-29.

Bostancı, Ö., Ünver, Ş., Kabadayı, M., Şebin, K., & İmamoğlu, M. (2017). 2012-2013 spor toto süper lig takımlarının sezon sonu sıralamasına etki eden faktörlerin incelenmesi. Beden Eğitimi ve Spor Bilimleri Dergisi, 19 (2), 78-88.

Bradley, P., O'Donoghue, P., Wooster, B., & Tordoff, P. (2007). The reliability of ProZone MatchViewer: a video-based technical performance analysis system. International Journal of Performance Analysis in Sport, 7(3), 117-129. https://doi.org/10.1080/24748668.2007.11868415

Bradley, P. S., Lago-Pe-as, C., Rey, E., & Gomez Diaz, A. (2013). The effect of high and low percentage ball possession on physical and technical profiles in English FA Premier League soccer matches. Journal of Sports Sciences, 31(12), 1261-1270. https://doi.org/10.1080/02640414.2013.786185

Carling, C. (2010). Analysis of physical activity profiles when running with the ball in a professional soccer team. Journal of Sports Sciences, 28(3), 319-326. https://doi.org/10.1080/02640410903473851

Castellano, J., Casamichana, D., & Lago, C. (2012). The use of match statistics that discriminate between successful and unsuccessful soccer teams. Journal Of Human Kinetics, 31, 137-147. https://doi.org/10.2478/v10078-012-0015-7

Clemente, F. M. (2012). Study of successful teams on FIFA World Cup 2010 through notational analysis. Pamukkale Journal of Sport Sciences, 3(3), 90-103.

Collet, C. (2013). The possession game? A comparative analysis of ball retention and team success in European and international football, 2007–2010. Journal Of Sports Sciences, 31(2), 123-136. https://doi.org/10.1080/02640414.2012.727455

Di Salvo, V., Collins, A., McNeill, B., & Cardinale, M. (2006), Validation of ProZone: A new video-based performance analysis system, International Journal of Performance Analysis in Sport, 6(1), 108–119. https://doi.org/10.1080/24748668.2006.11868359

Erdil, G., Bozkurt, S., İşleğen, Ç., & Ölçücü, B. (2013). 2010 Futbol dünya kupasında ispanya takımının kollektif performansının maçların kazanılmasında etkisi. Spor ve Performans Araştırmaları Dergisi, 2013, 4(2), 5-11.

Hughes, M., & Franks, I. (2005). Analysis of passing sequences, shots and goals in soccer. Journal of sports sciences, 23(5), 509-514. https://doi.org/10.1080/02640410410001716779

Taylor, J. B., James, N., & Mellalieu, S. D. (2005, May). Notational analysis of corner kicks in English premier league soccer. In Science and football V: The proceedings of the fifth world congress on football (pp. 229-234).

Jones, P. D., James, N., & Mellalieu, S. D. (2004). Possession as a performance indicator in soccer. International Journal of Performance Analysis in Sport, 4(1), 98-102. https://doi.org/10.1080/24748668.2004.11868295

Lago, C., & Martín, R. (2007). Determinants of possession of the ball in soccer. Journal of Sports Sciences, 25(9), 969-974. https://doi.org/10.1080/02640410600944626

Loy, R. (1995). Systematische Spielbeobachtung im Fußball. Leistungssport, 25(3), 15-20.

Manna, I., Khanna, G., & Dhara, P. (2011). Effect of training on morphological, physiological and biochemical variables of U-19 soccer players. Baltic Journal of Health and Physical Activity, 3(4), 237. https://doi.org/10.2478/v10131-011-0023-3

Michailidis, Y., Michailidis, C., & Primpa, E. (2013). Analysis of goals scored in European Championship 2012. Journal of Human Sport Exercise, 2013: 8(2) 367-375. https://doi.org/10.4100/jhse.2012.82.05

Mitrotasios, M., & Armatas, V. (2014). Analysis of goal scoring patterns in the 2012 European Football Championship. United States Sports Academy.

Njororai, W. W. S. (2013). Analysis of goals scored in the 2010 world cup soccer tournament held in South Africa. Journal of Physical Education and Sport, 13(1), 6.

Parziale, E. J., & Yates, P. A. (2013). Keep the Ball! The value of ball possession in soccer. reinvention: International Journal of Undergraduate Research, 6(1), 1-24.

Ridgewell, A. (2011). Passing patterns before and after scoring in the 2010 FIFA World Cup. International Journal of Performance Analysis in Sport, 11(3), 562-574. https://doi.org/10.1080/24748668.2011.11868574

Sajadi, N., & Rahnama, N. (2007). Analysis of goals in 2006 FIFA World Cup. J Sports Sci Med, 6(Suppl 10), 3.

Scoulding, A., James, N., & Taylor, J. (2004). Passing in the Soccer World Cup 2002. International Journal of Performance Analysis in Sport, 4(2), 36-41. https://doi.org/10.1080/24748668.2004.11868302

Tenga, A., & Sigmundstad, E. (2011). Characteristics of goal-scoring possessions in open play: Comparing the top, in-between and bottom teams from professional soccer league. International Journal of Performance Analysis in Sport, 11(3), 545-552. https://doi.org/10.1080/24748668.2011.11868572

Vogelbein, M., Nopp, S., & Hökelmann, A. (2014). Defensive transition in soccer–are prompt possession regains a measure of success? A quantitative analysis of German Fußball-Bundesliga 2010/2011. Journal of sports sciences, 32(11), 1076-1083. https://doi.org/10.1080/02640414.2013.879671

Wright, C., Atkins, S., Polman, R., Jones, B., & Sargeson, L. (2011). Factors associated with goals and goal scoring opportunities in professional soccer. International Journal of Performance Analysis in Sport, 11(3), 438-449. https://doi.org/10.1080/24748668.2011.11868563

Yiannis, M. (2014). Analysis of goals scored in the 2014 World Cup soccer tournament held in Brazil. International Journal of Sport Studies, 4(9), 1017-1026.