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Ending of Ball Possession Toward Field Zones in the Game of the World Championship Football 2014

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Abstract: Analyzing a soccer game is a process that analyzes, among other characteristics, how, where and why a particular team came into ball possession or lost it (Franks & Hughes, 2016). The problem that this research deals with is the ending of the ball possession to the field zones in the game of the 2014 World Championship. DVD records of all seven games played by the German National Team at the 2014 World Championship have been watched, and in the watch list each ending of ball possession is recorded in one of the four field zones. Statistical software SPSS 20 was used to process the collected data. A t-test was used to determine the differences between the individual field zones in the representation of the ending of ball possession. The highest number of ending of ball possession was achieved in zone D 439 (44.21%), and the lowest in zone A 68 (6.85%). Statistically significant differences in the representation of the ending of ball possession were determined between all four field zones $p < 0.05$.

KEYWORD: FOOTBALL, ATTACK PHASE, POSSESSION OF THE BALL

Introduction

Possession of the ball as part of the attack phase in football has been investigated since the 1970 (Gagajev, 1970). The paper pencil method, i.e. notative analysis, was applied, and the results on ball possession were expressed numerically in terms of the number of ball possessions per player per match and in seconds in terms of the duration of ball possession per match and per player. The analysis of a football match is a process in which, among other characteristics, it is analyzed how, where and why the team gained or lost the ball possession (Franks & Hughes, 2016). In the last 20 years, the application of more modern technology using cameras and various software has significantly increased the number of studies that dealt with the phase of football attacks (James & Mellalieu, 2004; Armatas, Zaggelidis & Papadopoulou, 2009; Tenga, & Ronglan, 2010; Peñas & Dellal, 2010; Dellal et al. 2011; Tenga, 2011; Michailidis, Michailidis & Primpa, 2012; Ruano, Gómez, Pérez-Tejero & Sampaio 2013; Peñas, Rey & Diaz, 2013; Alberti, Iaia, Arcelli, Cavaggioni & Rampinini 2013; Došić 2013, 2013a, 2014, 2014a, 2015, 2017, 2020; Durlik & Bienick 2014; Peñas & Martin, 2014; Peñas, 2014; Sporiš et. al. 2014; Göral, 2015; Meliki, Dadkhah, & Alahvisi, 2015; Hewit, Greenham, & North, 2016; Liu, Gómez, Gonçalves & Sampaio, 2016; Kim, James, Parmar & Vučković, 2019; Aquino,

Machade, Clemente & Praça, 2019; Rodenas, Malavés, Calabuig, & Casal, 2019; Cooper & Pulling, 2020; Zhao & Li, 2021).

Within the attack phase, numerous technical-tactical elements were investigated, their frequency, time duration, zones of ball possessions, number of passes within ball possession, number of contacts with the ball within ball possession of one player or team, number of contacts with the ball by field zones, interruptions of the match, ways of starting the ball possession, styles of play in the attack phase. The differences between the participants of various competitions (World Championships, European Championships, Champions League, National Championships) in various elements of the attack phase were also examined, as well as the connection between certain technical and tactical elements with each other and with fitness requirements in matches. It is known based on the calculation of the contact index how much the deviation from the theoretically simplest game is in terms of ball contacts per ball possession for certain football players individually as well as for teams as a whole. Theoretically, the simplest way is to play the ball with one ball contact within the ball possession, however, football practitioners know that the so-called "first ball" is in fact the most difficult to implement in competitive conditions. The completion of possession of the ball has been little researched so far, and this information can be useful to coaches in order to make possible corrections in the work and better get to know the shortcomings and virtues of their own and of the opposing team. Precisely for that reason, in this research, the research attention was focused on the zones of completion of the ball possession of the analyzed representation. It is also necessary to distinguish the possession of the ball from the attacking action of one team because during one attacking action the team can come into the ball possession several times and lose it.

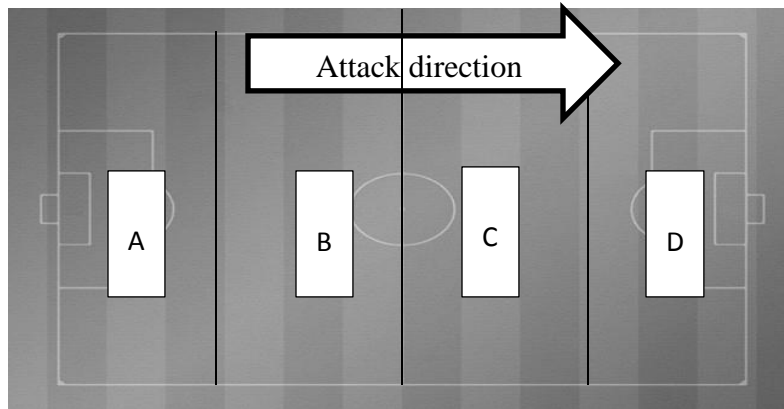
The aim of the research is to determine the frequencies of ending of ball possession in certain field zones and to examine whether there are differences between certain zones. It is expected to find differences between individual field zones in the frequencies of completion of ball possession in them. The subject of the research is the attack phase in the game of the winner of the World Championship 2014. The research problem is the completion of possession of the ball in the game of the analyzed National Team.

Method

Notative analysis was applied. All 7 matches played by the German National Team at the 2014 World Championship were observed. The frequencies of the observed characteristics of the attack phase were entered in a pre-prepared form. From the parameters of descriptive statistics were calculated: maximum and minimum value, arithmetic mean, standard deviation and coefficient of variance. A t-test of paired samples was used to examine the differences between individual zones of the field. The results are presented in tables and graphs.

Possession of the ball is calculated and lasts from the moment when a player of one team (in this research it is the German National Team) receives the ball from the teammate or takes it away

from the opposing player, or the players of the opposing team mistakenly add it to him until the moment of taking it away by the opposing players, incorrectly passing or sending a shot towards the opponent's goal. In this research it is expressed numerically.



Graph 1. Football field divided into zones

Results

Table 1 shows the results of descriptive statistics for the ending of ball possession by field zones. It can be seen that in all 7 matches, the lowest number of ball possessions ended in zone A, a total of 68, and the highest in zone D 439. In zone B were achieved 173, and in zone C 313 ball possessions ending. In a single match in zone A 5 is the lowest determined value of the ending of ball possession, and 17 is the highest value in the same zone. In zone D, the minimum value of the ending of ball possession per match is 53, and the maximum value is 78. Such results are logical and expected because the team of World Championship winners is analyzed, from who it is expected to play offensive football with a lot of time will ball possession on the so-called opponent's half part of field.

Table 1. Descriptive characteristics by field zones

Zone	N	Min	Max	Sum	Mean	Std. dev.	Cv%
A	7	5	17	68	9,71	4,15	17,24
B	7	14	32	173	24,71	7,365	54,24
C	7	34	64	313	44,71	9,83	96,57
D	7	53	78	439	62,71	9,10	82,57

Table 2 shows the t-test results of paired samples. The zones of the field were compared according to the representation of the ending of ball possession in them. Based on the value of $p < 0.05$, it can be concluded that there is a statistically significant difference between all four zones in the analyzed variable.

Table 2. Results t- of paired samples

Pair of zones	t	df	p
A - B	-5,067	6	,002
A - C	-8,870	6	,000
A - D	-12,593	6	,000
B - C	-5,061	6	,002
B - D	-9,719	6	,000
C - D	-3,201	6	,019

Table 3 shows the results of the middle ranking of ball possessions finishes for each of the seven games played by the winners of the 2014 World Championship. In column A, it can be noticed that the least number of ball possessions ended in the first round of the group stage of the competition between Germany and Portugal and is 1, expressed in absolute numbers there were 5. It can also be noticed that the highest recorded ball possessions was in zone A, in the semifinal match between Germany and Brazil, the middle ranking is 7 and expressed in absolute numbers 17.

Unlike zone A, in zone B, the fewest endings of ball possessions were recorded in the final match in which the German National Team played with the National Team of Argentina, a total of 12 most ball possessions was recorded in the semi - final match against Brazil, a total of 32. In zone C, based on the value of middle rank 1, it can be concluded that the least recorded endings of ball possessions was in the third game of the group stage competition, and the most in the ¼ final match against the French National Team where the middle rank was 7. In Zone D, as for Zone A, the least recorded endings of ball possessions were recorded in the first game of the group stage competition against the Portuguese National Team, and the highest middle ranking for Zone D was obtained in the 1/8 finals game against Algeria.

Tabela 3. Middle rank for ending zones of ball possessions of the German National Team

Matches	N	Zone	Mean Rank	Zone	Mean Rank	Zone	Mean Rank	Zone	Mean Rank
Ger.-Port.	1		1,00		3,00		3,00		1,00
Ger.-Ghan.	1		2,50		5,50		5,50		5,00
Ger.- USA	1		4,00		2,00		1,00		6,00
Ger.-Alg.	1		2,50		5,50		5,50		7,00
Ger.-Fran.	1	A	5,50	B	4,00	C	7,00	D	2,00
Ger.-Braz.	1		7,00		7,00		2,00		3,50
Ger.-Arg.	1		5,50		1,00		4,00		3,50

Discussion

It is generally known that a football match, viewed from the angle of one team, consists of an attack phase and a defense phase. The reason for researching the problem of ending ball possession within the attack phase is that so far this problem has been little researched, and also the author of one of the previous researches dealt with the problem of the beginning of ball possession of the same team and in the same competition. The results of this research can be significant for the theory and practice of the football game. Analyzing a football match is a process in which, among other characteristics, it is analyzed how, where and why the team came or lost the ball possession (Franks & Hughes, 2016).

As expected and logical, a greater number of endings of ball possessions was achieved on the so-called "opponent's half part of field" compared to the so-called "own half of field", expressed in absolute numbers it is 752 to 241 and in percentage 73% versus 24.23% in favor of the so-called "opponent's half part of field". As expected, differences were found between all four field zones in the recorded endings of ball possessions in them expressed in absolute numbers. In zone A, 68 ending of ball possessions were recorded in all seven games, in zone B 173, in zone C 313 and in zone D 439. Statistically significant differences were also determined by applying the t-test, $p < 0.05$. As for the individual matches and the recorded endings of the ball possessions, differences from match to match are noticed. Probably, the applied tactics also influenced that. Such or similar results are expected on the basis of logical thinking, a possible contribution to the theory of football could be the numerically and percentage expressed results of the ending of ball possessions in the zones of the field.

Unlike to the endings of ball possessions of the German National Team at the World Championship 2014 and the determined statistically significant differences between all four field zones by applying t-test at the beginning of the ball possession by the same National Team at the same competition and applying the same test, statistically significant differences were found between A-D, B-D and C-D zones, while no statistically significant differences $p > 0.05$ were found between zones A-B, A-C and B-C. Comparing 10 matches of the English Premier League and the Spanish La Liga and a total of 4971 (2469 + 2502) ball possessions on them (Cooper & Pulling, 2020) determined that in the defensive zone in the EPL, the most beginnings of ball possessions were 801 (32.4%). However, in La Liga, most of the beginnings of ball possessions were achieved in the zone of the field in front of the defensive, which the authors called pre-defense 811 (32.4%). The fewest beginnings of ball possessions were found in the fourth field quarter, in the attack zone, in the EPL 329 (13.3%), and in the La Liga 324 (12.9%).

When we compare the obtained values of the middle rank for all 7 matches, it can be seen that only on the matches against the National Teams of Algeria and Brazil the maximum number of beginnings and endings of ball possessions in zones A and D were achieved, and the end of possession of the ball in all four zones of the court. In all other matches of the German National

Team, the maximum and minimum values of the recorded beginnings and endings of ball possessions in all four zones of the field differ.

It is known that in the ball possessions of the German National Team at the World Championship 2014, an average of 621.4 players participated per match, an average of 585.3 passes were made, 1358.7 contacts with the ball were made by all players participating in the ball possessions, an average number of ball contacts per player was 2.18 and an average duration of ball possession per game was 30.8 minutes. 4350 players participated in all 7 games in ball possession, they realized 4097 passes, 9511 ball contacts, and the time of ball possession was 215.6 minutes. The number of players participating in ball possession per match was a minimum of 459 and a maximum of 806. The minimum number of recorded passes per match was 424, and the maximum was 756. The minimum number of contacts with the ball per match was 968 and the maximum 1740. Minimum ball contacts per player was 2.11 and maximum 2.27 and the minimum duration of ball possession recorded per game was 24.4 minutes and a maximum of 36.52 minutes (Đošlić, 2019).

Conclusion

As expected, this research determined the differences between all four zones of the field in the recorded endings of ball possession in the game of the German national team at the 2014 World Championship. Differences exist when the comparison is performed in absolute numbers, and statistically significant differences were also found between all four zones of the field using the t-test, $p > 0.05$. The results obtained can be useful to football theorists and practitioners.

Literature

Armatas, V. Zaggelidis, G & Papadopoulou, S. (2009). Goal Scoring patterns in greek top leveled soccer matches. *Journal of Physical Education an Sport*. Vol. 23, no 2. 1-5.

Alberti, G. Iaia, M. Arcelli, E. Cavaggioni, L. & Rampinini (2013). Goal Scoring patterns in major European soccer leagues. *Sport Sci Health* 9:151-153.

Aquino, R. Machade, J.C. Clemente, F.M. & Praça, G. (2019). Comparisons of ball possession, match running performance, player prominence and team network properties according to match outcome and playing formation during the 2018 FIFA World Cup. *International Journal of Performance Analysis in Sport*. Vol. 19, No. 6, 1026-1037.

Bradly, P. Peñas, L.C. Rey, E. & Diaz, A.G. (2013). The effect of high and low percentage ball possession on physical and technical profiles in English FA Premier League soccer matches. *Journal of Sport Sciences*

<http://dx.doi.org/10.1080/02640414.2013.786185>

Cooper, D. & Pulling, C. (2020). The impact of ball recovery type, location of ball recovery and duration of possession on the outcomes of possessions in the English premier League and the Spanish La Liga. *Science and Medicine in Football*.

<https://doi.org/10.1080/24733938.2020.1722319>

- Dellal, A. Chamari, K. Wong, D.P. Ahmaidi, S. Kejjar, D. Bororos, R. Bisciotti, G.N & Carling, C. (2011). Comparasion of physical and technical performance in European soccer match-play: FA Premier League and La Liga. *European Journal of Sport Science*. 11 (1):51:59.
- Durlik, K. & Bienick (2014). Analysis of goals and assists diversity in English Premier League. *Journal of health Sciences*. 04 (05); 047-056.
- Đošić, N. (2013). Kontakt indeks reprezentacije Holandije na utakmicama Svetskog fudbalskog prvenstva 2010. Godine [Contact Index in the Game of the National Team of the Netherlands on the World Championship 2010]. In 3th International Conference on *Sport Science and Health* 150-153.
- Đošić, N. (2013). Broj dodira prilikom odigravanja loptom po zonama terena u igri reprezentacije Nemačke na utakmicama Svetskog fudbalskog prvenstva 2010. godine [Number of Contacts and Ball Playing by Field Zone in the Game of the German national Team on the World Championship 2010.] U 6. Međunarodna konferencija *Vaspitno.obrazovni i sportski horizonti* str.201-204. Subotica: Visoka škola strukovnih studija za obrazovanje vaspitača i trenera.
- Đošić, N. (2014). Razlike u posedu lopte, kontaktima sa loptom i kontakt indeksima osvajača medalja na Svetskom fudbalskom prvenstvu 2010. godine [Differences in Ball Possession, Contacts With the Ball and Contacts Index of the Medal Winners on the World Championship 2010]. *Sport Science and Health*. 4 (1): 64-72.
- Đošić, N. (2014). Frekvencija i učestalost ubacivanja lopte sa strane u savremenom fudbalu [Frequency and Efficiency of Putting the Ball Into Play from the Side in Modern Football]. *Sport Science and Health*. 4 (2): 159-168.
- Đošić, N. (2015). *Ofanzivni prekidi igre u savremenom fudbalu* [Offensive game breaks in modern football]. Belgrade: Zadužbina Andrejević.
- Đošić, N. (2017). Povezanost poseda lopte, kontakata sa loptom I kontakt indeksa u savremenom fudbalu [Correlation of Ball Possession, Contacts with Ball and Kontakt Index in Modern Football]. *Serbian Science Today*. Vol. 2, No.1, 44-55.
- Đošić, N. (2019). Početak poseda lopte prema zonama terena u igri svetskih fudbalskih šampiona 2014. godine [Beginning of Ball Possession Toward Fieled Zones in the game of Football World Champions 2014]. In International Scientific Conference *Effects of Physical Activity Application to Antropological Status with Children, Adolescents and Adults*.550-554.
- Đošić, N. (2020). Characteristics of the attack structure of the Winer of the Football World Championship 2014. In International Scientific Conference *Effects of Physical Activity Application to Antropological Status with Children, Adolescents and Adults*.61-65.
- Franks, J. & Hughes, M. (2016). Soccer Analytics Successful coaching throught match analysis. Meyer & Meyer Sport (UK).
- Gagajev, G.M. (1970). Psihološka karakteristika kretne aktivnosti fudbalera. Stručni bilten Fudbalskog saveza Srbije, br.3.
- Göral, K. (2015). Passing Success Percentages and Ball Possession Rates of Successful Teams in 2014 FIFA World Cup. *International Journal of Science Culture and Sport* 3 (1): 86-95.
- Hewit, A. Greenham, G. & North, K. (2016). Game style in soccer: what is it and can we quantify it? *International Journal of performance Analysis in Sport* 16, 355-372.

- James, N. & Mellalieu, S. (2004). Possession as a Performance Indicator in Soccer. *International Journal of performance Analysis in Sport* July, 98-102.
- Kim, J. James, N. Parmar, N. & Vučković, G. (2019). The Attacking Process in Football: A Taxonomy for Classifying How Teams Create Goal Scoring Opportunities Using a Case Study of Crystal Palace FC. *Frontiers in Psychology*. Vol. 10 article 2202.
- Li, C. & Zhao, Y. (2021). Comparasion of Goal Scoring Patterns in “The Big Five” European Football Leagues. *Frontiers in Psychology*. Vol. 11 article 619304.
- Liu, H. Gómez, M.-A. Gonçalves & Sampaio, J. (2016). Tehnical performance and match-to-match variation in elite football teams. *Journal of Sport Science*. Vol. 34, No. 6, 509-518.
- Peñas, L.C & Martin, R. (2007). Determinants of possession of the ball in soccer. *Journal of Sport Sciences* 25 (9): 969-974.
- Peñas, L.C (2009). The influence of match location, quality of opposition, and match status on possession strategies in professional association football. *Journal of Sport Sciences* 27 (13): 1463-1469.
- Peñas, L.C. & Dellal, A. (2010). Ball Possession Strategies in Elite Soccer According to the Evolution of the Match-Score: the influence of Situational Variables. *Journal of Human Kinetics* Vol.25, 93-100.
- Michailidis, Y. Michailidis, C.& Primpa, E. (2013). Analysis of goals scored in European Championship 2012. *Journal of Human Sport & Exercise* Vol. 8, Proc. 2, 367-375.
- Meliki, M. Dadkhah, K. & Alahvisi, F. (2015). Ball recovery Consistency as a Performance Indicator in Elite Soccer. *Rev Bras Cineantropom Desepenho Hum* 18 (1): 72-81.
- Rodenas, J.G. Malavés, R.A. Calabuig, F.& Casal, C. (2019). Effect of Match Location, team ranking, Match Status and Tactical Dimesions on the Offensive Performance in Spanish 'La Liga' Soccer. *Frontiers in Psychology*. Vol. 10 article 2089.
- Sporiš, G. barišić. V. Fiorentini, F. Ujević, B. Jovanović, M & Talović, M. (2014). *Situaciona efikasnost u nogometu*. [Situational efficiency in football] Zagreb: Stega-tisak.
- Tenga, A. & Ronglan, L.T. (2010). Effect of Playing tactics on goal scoring in Norwegian professional soccer. *Journal of Sport Sciences* 28 (3): 237-244.
- Tenga,A. (2011). Characteristic of goal-scoring possessions in open play: Comparing the top, in-between and bottom teams from professional soccer. *International Journal of Performance Analysis in Sport*. Vol. 11, 545-552.