Kinesiologia Slovenica, 23, 3, 32–38 (2017), ISSN 1318-2269

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INFLUENCE OF TACTICAL VARIABLES ON ATTACKING ACTIONS IN ELITE SOCCER

VPLIV TAKTIČNIH SPREMENLJIVK NA AKCIJE V NAPADU V VRHUNSKEM NOGOMETU

ABSTRACT

The aim of this study was to analyze the influence of tactical variables on attacking actions in elite soccer match-play. A total of 1417 attacking actions were collected from ten Spanish LaLiga and English Premier League matches from 2006-2007 season. The Amisco® match analysis system was employed to collect data. The following variables were included for the analysis: pass number, players number, duration, starting zone (SZ) and final zone (FZ). The results showed that 24.3% of these actions where performed without passes, the remaining 57%, 11,6% and 7,1% were performed with ≤ 3, 4-6, and ≥ 7 consecutive passes. Furthermore, one third (25,9%) of these offensive actions involved a single player, while the remaining 74,1% (collective actions) involved 2-5 players and ≥ 6 players for a 65,6% and 8,5%, respectively. Finally, according to the five classes of duration the 49,3%, 26,4%, 12%, 13% and 6,5% of these offensive actions were lasting < 6 seconds, 6-12 seconds, 12-18 seconds, 18-24 seconds and > 24 seconds, respectively. The analysis of the 9 zones, grouped in 3 areas of intervention, showed as 39.1% of actions started into the defensive area, 42.0% into the midfield area and only 18.9% into the attacking area. The variables analyzed should be considered when analyzing attacking actions in elite soccer.

Key words: Match Analysis , Tactics , Soccer

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IZVLEČEK

Namen te študije je bil analizirati vpliv taktičnih spremenljivk na akcije v napadu na tekmi vrhunskega nogometa. V sezoni 2006–2007 smo zbrali skupno 1417 akcij v napadu na tekmah španske LaLige in angleške Premier League. Za zbiranje podatkov smo uporabili sistem za analizo tekem Amisco®. Naslednje spremenljivke so bile vključene v analizo: število podaj, število igralcev, trajanje, začetna cona (ZC) in končna cona (KC). Rezultati so pokazali, da je bilo 24,3 % teh akcij izvedenih brez podaj, preostalih 57 %, 11,6 % in 7,1 % pa je bilo izvedenih z ≤ 3, 4–6 oz. ≥ 7 zaporednimi podajami. Poleg tega je ena tretjina (25,9 %) napadalnih akcij vključevala samo enega igralca, preostalih 74,1 % (kolektivne akcije) pa je vključevalo 2–5 igralcev (65,6 %) in ≥ 6 igralcev (8,5 %). Po kriteriju petih razredov trajanja pa so napadalne akcije trajale: 49,3 % < 6 sekund, 26,4 % 6–12 sekund, 12 % 12–18 sekund, 13 % 18–24 sekund in 6,5 % > 24 sekund. Analiza 9 con, razdeljenih v tri področja intervencij, je pokazala, da se je 39,1 % akcij začelo v obrambni coni, 42,0 % v srednjem delu igrišča in samo 18,8 % v napadalni coni. Analizirane spremenljivke je treba upoštevati pri analizi napadalnih akcij v vrhunskem nogometu.

Ključne besede: vrhunski šport, nogomet, taktika, napad

INTRODUCTION

In soccer, as well as in other invasion team sports, a match can be seen as a complex and dynamic system where two teams interact to contest ball possessions and seek territorial advantages (Correia, *et al.,* 2011). The main purpose of this dispute is to score a goal and prevent the opponent to do the same, with the two teams interrelated by a relationship of opposition where their ability to recover, conserve, and move the ball into the scoring zone is confronted through individual and collective actions (Gréhaigne and Godbout, 1995, Grehaigne *et al.,* 1997). Over the last two decades, the continuous evolution of soccer has determined an increase of the temporal and spatial pressure exerted on players' performance, reducing their time to take appropriate decisions and the space to perform correct technical actions (i.e., receiving, dribbling and passing the ball, etc.). However, while the soccer's physiological demands have been largely studied, the changes occurred for technical and tactical aspects have been less investigated. Consequently, researchers are required to focus more on players' interactions in order to investigate their game behaviors (McGarry *et al.,* 2009, Duarte et al., 2012, Frencken *et al.* 2011), the type and quality of these interactions (Duarte *et al.,* 2012) and the tactical organization of the teams (Bartlett *et al.,* 2012).

Furthermore, considering the specific nature of soccer it has been underlined also the necessity to investigate the strategic aspects of performance in relation to situational variables (Lago *et al.,* 2010), such as match status, quality of the opposition and match location (Taylor *et al.,* 2008), rather than simple frequency counts of tactical and technical parameters. In this respect, based on the available literature, Liu *et al.* (2015) have proposed a model where the match events and variables are grouped as: 1) variables related to goal scoring; 2) variables related to passing and organising; 3) variables related to defending; 4) contextual variables. Nevertheless, Mackenzie and Cushion (2013) warn as often the analyses have been based on causal relationships between isolated performance variables, which could reduce the complexity of the analysis and underestimate the potential role of confounding variables. In addition, Carling et al., (2014) suggested as on the field side the type of analyses considered 'straightforward' are still the most recurrent in elite soccer, and the goal to fix a standardised set of 'key performance indicators' is still far to be acquired.

Therefore, considering the need to profile specific players' game behaviors this study aimed to investigate the influence of situational and tactical variables exerted on the offensive actions performed during international elite soccer matches, in relation to match status and domestic league differences.

METHODS

Thus, to assess the effects that match status and potential differences of playing style related to the characteristics of domestic league can have on attacks, performed by outfield soccer players (goalkeepers were excluded) the zones of the pitch were these actions were starting and ending, the number of players involved in and the duration of each action, as well as the length and width of the players dislocation on the playing surface were registered (Carling et al., 2005; Taylor, Mellalieu, James, & Shearer, 2008; Tucker, Mellalieu, James, & Taylor, 2005).

Match sample and variables

The analysis of this study was conducted on ten international elite soccer matches recorded during the 2006-2007 season, of which six were selected from the Spanish La Liga and four from the

English Premier League. The Spanish and English Leagues are considered, by the International Federation of Football History and Statistics (IFFHS), to be among the three strongest European Leagues of the 1st Decade of the 21st Century (Sarmento et al., 2014).

Thus, a sample of 1417 offensive actions were analyzed by means of the following match events and situational variables:

a) Pass Number. Number of passes made by the attacking team;

b) Players Number.

c) Duration. Time elapsed from the beginning and the end of an observed action;

d) Starting Zone (SZ). Zone of the pitch where an offensive action started;

e) Final Zone (FZ). Zone of the pitch where an offensive action ended;

Procedures

The movements of the outfield players during each entire match were captured by using a multiple-camera match analysis system (AMISCO PRO®, version 1.0.2, Nice, France) composed by 8 stable synchronized cameras positioned at the top of the stadium (sampling frequency 25 Hz). Signals and angles obtained by the encoders were sequentially converted into digital data and recorded on six computers for post-match analyses with playing distances processed through the software Amisco Pro® (Animation Mode, Nice, France), which has been validated in previous studies (Di Salvo et al., 2007, 2008; Zubillaga et al., 2008). In particular, the Animation Mode AMISCO PRO® divides the pitch in 9 zones (three zones each for the defensive, midfield and and offensive half pitch, respectively) parallel to the halfway and goal lines (Figure 1 and 2).

All the procedures in this study were processed in accordance with the Declaration of Helsinki and were approved by the Human Research Ethics Committee of the University of Granada (Granada, Spain).

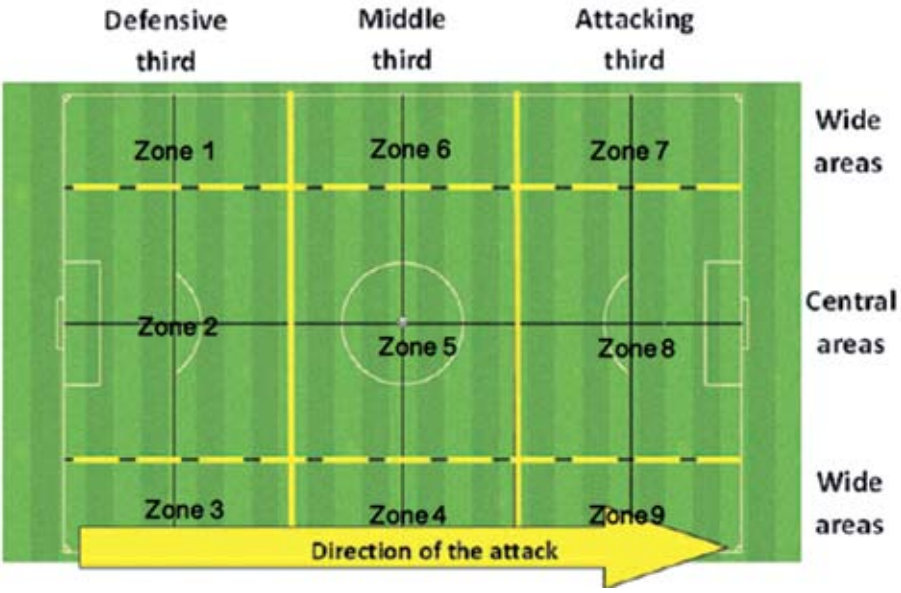

Figure 1. Pitch divisions in three thirds parallel to the goal lines and parallel to the touchlines.

Statistical analysis

Means, standard deviations and ranges (i.e., minimum and maximum) were calculated for each dependent variable. Data are presented as mean values and SDs of frequency of occurrence (%). Before the study the Kolmogorov test was applied to test the normal distribution of the data. Since parametric assumptions (normality and homogeneity of variance) were not verified, the non-parametric statistics was applied.

The Spearman's rho test was applied to test the correlation between initial and final playing length and initial and final playing width, while differences between Leagues *(La Liga* and *Premier League)* were assessed by means of Mann-Whitney Test.

All statistical analyses were carried out using IBM SPSS 23.0 (SPSS Inc., Chicago, USA) and the significance level was set at $p<0.05$.

RESULTS

a) Results with grouped data

A grand total of 1417 offensive actions, form the two leagues *(La Liga* and *Premier League)* were selected for the analysis of this study. In particular, whilst a 24.3% of these actions where performed without passes, the remaining 57%, 11,6% and 7,1% were performed with ≤ 3, 4-6, and ≥ 7 consecutive passes, respectively. Furthermore, one third (25,9%) of these offensive actions involved a single player, while the remaining 74,1% (collective actions) involved 2-5 players and ≥ 6 players for a 65,6% and 8,5%, respectively. Finally, according to the five classes of duration the 49,3%, 26,4%, 12%, 13% and 6,5% of these offensive actions were lasting < 6 seconds, 6-12 seconds, 12-18 seconds, 18-24 seconds and > 24 seconds, respectively. The interactions of these data with match periods and match status have been reported in table 1 and 2, respectively.

Table 1. Descriptive statistics in passes

		PASSES			
		Frequency	Percentage	Percentage valid	Accumulated Percentage
Valid	0	345	24,3	24,3	24,3
	1	398	28,1	28,1	52,4
	2-3	409	28,9	28,9	81,3
	4-5-6	165	11,6	11,6	92,9
	>=7	100	7,1	7,1	100,0
	Total	1417	100,0	100,0	

The analysis of the 9 zones of the pitch where the offensive actions were starting (fig. 1), grouped in 3 areas of intervention, showed as 39.1% of actions started into the defensive area, 42.0% into the midfield area and only 18.9% into the attacking area. In particular, data referred to the single zones showed higher percentages for zone 2 (27.4%) and zone 5 (24%) which are the central zones of the defensive and midfield areas, respectively. Moreover, the analysis of the zones where the offensive actions were ending, data revealed as 14.7% were concluded into the zones corresponding

Table 2. Descriptive statistics in duration

		DURATION			
		Frequency	Percentage	Percentage valid	Accumulated percentage
Valid	< 6	698	49,3	49,3	49,3
	6-12	375	26,4	26,4	75,7
	12-18	170	12,0	14,2	87,7
	18-24	104	13,0	10,1	93,5
	> 24	92	6,5	6,5	100,0
	Total	1417	100,0	100,0	

to the defensive area, 38% into the midfield area and 47.3% into the attacking area. In particular, similarly to the starting zones, two central zones showed higher percentages to end actions, with 22% and 32.4% for zone 2 (midfield area) and zone 5 (attacking area), respectively.

DISCUSSION

This study aimed to investigate the influence of situational and tactical variables exerted on the offensive actions performed during international elite soccer matches.

The main findings of this study were that: 1) at elite level, two-thirds of the offensive actions were performed in a collective way; 2) in order to increase the chance of success, actions were performed with less than 5 passes and six seconds.

In this study, the occurrence of individual and collective actions executed to finalize the ball possessions has been investigated by means of the analysis of attacks, counterattacks and direct attacks. The high level of the teams involved explains the high attitude of these teams to finalize a ball possession mainly through a collective play. Indeed, only a 29.6% of actions were carried out with individual solutions compared to the 70.4% of the collective ones, of which a 9.6% were achieved with ≥ 6 players and 60.8% with 2-5 players. This data confirms the fact that even at the highest level the ability of a team to score a goal (that is theoretically the ultimate aim of any offensive action, regardless if it is achieved or not) depends more on passing abilities, rather than a sole action of one player. Thus, related with these data are those regarding the numbers of passes and duration of actions. Consequently, during an established offense the passing abilities of the individuals are critical for the ability of the team to move as a group, requiring a complex level of interaction among its individuals (Hewit et al., 2016). The results of the analysis of passes showed that 40.1% and 23.5% of the offensive actions were performed with 2-3 passes and 4-6 passes, respectively. Despite one would expect a higher number of consecutive passes due to the top level of these clubs, the fact that four offensive actions every ten were performed with 2 or 3 passes has to be properly interpreted as distinguishing feature of the competitive level. In fact, based on the principles of play that influence an "invasion game" match (as the case of soccer) the relationship (of opposition) between the two teams requires each of them to coordinate their actions in order to recover, conserve, and effectively move the ball into a scoring zone (Gréhaigne & Godbout, 1995). However, the notion of "attack" can be seen as a sort of preparatory phase where the team in possession of the ball is conserving it (maintaining its possession), which can

require the choice to use more passes per action, and a sort of finalization phase where the teams in possession of the ball attempts to score or taking a shot, which often requires the choice to use fewer passes in a quick time. To confirm this fact, also the analysis of duration showed as seven actions every ten (75,7 %) were lasting up to 12 seconds, while 89.4 % of actions lasted up to 24 seconds. In addition, another aspect that… is that when the match status in relation the score was considered, that is whether a team was drawing or + 1 goal or + 2 goals or below 1 goal, the higher within match status condition percentage (70.8%) of offensive actions was registered for the class <10 seconds in condition of balance, while the higher value for actions of long duration (>40 seconds) was found in a – 1 goal condition. This trend could be speculated by the fact that the teams during a balance condition of the match were intent on building an action that would lead to score by exploiting a reduced time and number of passes, while during a disadvantage condition the same teams were more prone on building actions with more players involved and passes, which require a more accurate support of all players and reduce the risk of a counterattack of the opponent.

CONCLUSIONS

The results from this study showed that at elite level, two-thirds of the offensive actions were performed in a collective way. Moreover, attacking actions that were performed with less than 5 passes and six seconds increased the chance of success. Lastly, around half of the attacking actions analyzed started in zones 2 and 5, and around half of de attacking actions finished in the opposing half of the pitch.

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