Tenga, A., Zubillaga, A., Caro, Ó., Fradua, L. (2015). Explorative study on patterns of game structure in male and female matches from elite Spanish soccer. *International Journal of Performance Analysis in Sport, 15*, 411-423.

Explorative Study on Patterns of Game Structure in Male and Female Matches from Elite Spanish Soccer

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Abstract

The aim of this study was to explore emergent patterns of game structure in male and female matches from elite soccer by using playing distances measured according to the ball location. Archive data based on carefully selected four male and four female matches from elite Spanish soccer seasons 2002-3, 2003-4 and 2004-5 were collected by help of AMISCO PRO® system. Differences across six ball locations were found in mean playing length (χ^2_5=328.1 and 520.9, P<0.001) and playing width (χ^2_5=39.6 and 26.9, P<0.001) from male and female matches, respectively. Both sexes displayed similar movements in playing length that vary with stretch-contraction-stretch patterns and in playing width that vary with opposite patterns of contraction-stretch-contraction, but these patterns varied to a significantly greater extent in male matches. For example, male matches (mean=44.93±8.34 m) produced significantly (U=128564.0, z=-8.2, P<0.001) longer playing width during transition phase in midfield compared with female matches (mean=41.80±8.00 m). Results suggest that female matches produced less favourable patterns of game structure with fewer penetration opportunities than male matches. Specific suggestions for coaching intervention were given. This study demonstrates the potential of analysing playing distances according to the ball location for studying patterns of game structure in real soccer matches.

Keywords: Soccer, match performance analysis, game structure, movement behaviour, sex differences

1. Introduction

Understanding patterns of game structure from real soccer matches could make coaching intervention more specific and objective, and therefore facilitate the improvement of teams' tactical performance during match play. Tactical expertise is generally considered as a prerequisite for expert performance in sports (Janelle & Hillman, 2003) and in soccer, for example, specific procedural knowledge related to game structure referred to as *Positioning and deciding* was found to be the best tactical skill to predict players' professional level of performance (Kannekens, Elferink-Gemser, & Visscher, 2011). The scales *Positioning and deciding* used by these researchers assessed players' knowledge related to how to create space, making decisions about proceeding actions, overview, anticipation and to the positioning ability during match play.

Performance analysis researchers have previously used different types of compound variables such as surface area (e.g. Frencken, Lemmink, Delleman, & Visscher, 2011b), geometrical centre (e.g. Travassos, Araujo, Duarte, & McGarry, 2013), radius or stretch index (e.g. Yue, Broich, Seifriz, & Mester, 2008a), team length and team width (e.g. Duarte et al., 2013), and centroid distance (e.g. Folgado et al., 2014) to study space-time dynamics of players' collective movement in soccer. The common finding reported from these studies is a synchronised displacement of two opposing teams in both directions of the pitch, especially in longitudinal (goal-to-goal) direction. In addition, Sampaio and Maçãs (2012) detected the effect of training program on movement behaviour in both longitudinal and lateral (side-to-side) directions, with more effect registered in longitudinal direction. Elsewhere, teams' synchronised behavioural patterns were identified in both lateral and longitudinal directions, but more so between teams and a ball than between two opposing teams (Travassos et al., 2013). Teams' collective movement behaviour that relate to the offensive and defensive tactical strategies (Duarte et al., 2014; Lames, Erdmann, & Walter, 2010; Vilar, Araújo, Davids, & Bar-Yam, 2013; Yue, Broich, Seifriz, & Mester, 2008b), to key match events like goals and game breaks (Duarte et al., 2013) and those relate to collective defensive actions and team reorganisation at set plays (Frencken, De Poel, Visscher, & Lemmink, 2012) were also reported.

These previous studies show promising effects of using compound variables to study teams' tactical movements in soccer. However, the absolute majority of these studies have either focused on small-sided games (SSGs) (e.g. Sampaio & Maçãs, 2012) and futsal (e.g. Travassos et al., 2013) or are based on limited data from only one full-sized game (Duarte et al., 2013). At the same time, it is unclear to what extent the knowledge accumulated from studies on SSGs and futsal is actually transferrable to a full-sized game (Lemmink & Frencken, 2013). Indeed, Bartlett et al. (2012) could not relate the identified synchronised movement behaviours to any key match events from open play which included goals, shots on goal and tackles in a study based on five full-sized matches from elite soccer. Also, a study based on one half of a full-sized soccer game (Frencken, De Poel, & Lemmink, 2011a) failed to replicate results from a similar study on SSGs (Frencken et al., 2011b). Hence, soccer practitioners still lack the contribution of specific objective guidelines based on empirical findings to support their work to improve players' collective movement skills in real soccer matches. Established soccer coaches of women's game, for example, have been reported to use considerable amount of precious time to practice spacing and team shape (Kirkendall, 2007).

As a reflection of the relationship between space and time during soccer match play, as described by the dynamic-system approach, game structure may represent constant adaptation to multiple constraints present in a match action due to the confrontation between two opposing teams (Elias & Dunning, 1966; Gréhaigne, Bouthier, & David, 1997; Araújo, Davids, & Hristovski, 2006). Since *playing distances*, measured bi-dimensionally (2D) and over time, indicate changes in spatial-temporal relations emerging during match play, they may be useful in evaluating patterns of game structure in real soccer matches (Duarte et al., 2013). It is here further recognised that playing distances do also depend on players' dynamic positioning governed by the principles explaining the structure of the soccer game (e.g. Olsen, Larsen, & Semb, 1994) and, therefore, are likely to vary according to the location of the ball on the pitch. This is because of the different spatial-temporal demands of match action specific to pitch location. According to Bangsbo and Peitersen (2000), build-up play in soccer occurs near one's own goal, transition play takes place in the midfield, and finishing phase happens near the opponent's goal. It seems that there are specific demands of tactical movements linked to those phases of match play in particular areas of the pitch. Hence, together with the structural understanding of the game, the position of the ball and its ownership should also be accounted for to achieve a complete description of game structure in soccer (McGarry, 2009; Travassos et al., 2013).

Differences in techniques, tactics and fitness between men's and women's game have been reported in soccer (e.g. Kirkendall, 2007). Also, different game-related statistics between male and female performances have been reported in basketball (e.g. Sampaio, Ibáñez, & Feu, 2004) and in volleyball (e.g. Joao, Leite, Mesquita, & Sampaio, 2010). Such differences in game performance are generally attributed to anthropometric and physiological differences between women and men (e.g. Joao et al., 2010). However, to our knowledge, differences of tactical performance related to game structure between male and female soccer matches have so far not been explored. At the same time, practitioners in woman soccer have expressed a need to improve female players' understanding of the game flow and argued that female players often display inferior levels of tactical performance compared with their male counterparts due to their limited exposure to learning opportunities from watching top-level women matches (Kirkendall, 2007). Indeed, unlike anthropometric- and physiological-based skills, tactical skills rely primarily on cognitive skills that are typically divided into declarative (''knowing what to do'') and procedural knowledge (''doing it'') (e.g. Turner & Martinek, 1999).

The aim of this study was to explore emergent patterns of game structure in male and female matches from elite soccer by using *playing distances* measured according to the six different ball locations on the pitch. We sought to explore the use of playing distances as patterns of game structure to study players' collective movement skills in real soccer matches. Based on dynamic-system approach and the structural understanding of the game, it was expected that playing distances along (goal-to-goal) as well as across (side-to-side) the pitch would vary significantly according to ball location on the pitch regardless of sex. In addition, playing distances across the pitch were expected to be longer when the ball is in the middle areas of the pitch compared to the areas near-the-goal since the playing area is normally more congested in the midfield. On the other hand, playing distances along the pitch were expected to be the opposite, with shorter distances when the ball is in the middle areas of the pitch than in the areas near-the-goal. This is due to the attacking-defending nature of the soccer game whereby a team is needed to keep one's defence in mind while attacking as well as to get ready to attack while defending. Further, these opposite variations of playing distances were expected to follow similar patterns regardless of the sex, but with larger variations in male than female matches because of the possibility of higher levels of tactical performance in male matches.

2. Methods

2.1. Materials

A sample included available archive data based on four male matches from *La Liga* during the 2002-03 season and four female matches from *La Superliga* during 2003-04 and 2004-05 seasons that were found appropriate for our study. The match-selection criteria included matches that were played on identical pitch size of 105x68 m, from a similar time period and that involved teams using similar playing formations. The male matches involved five different teams; one team played twice at home and another team three times away, leaving the remaining three teams played once at home (two teams) and once away (one team). The female matches involved four different teams, whereby two teams played once away, one team played twice away and one team played four times at home.

A total of 5331 playing distances from male matches (n=2575, 48%) and female matches (n=2756, 52%) were collected and used in this study. Ethics approval for all experimental procedures was granted by the University of Granada Human Research Ethics Committee. Written permission from AMISCO PRO® was obtained before the study began.

2.2. Data collection procedure

All matches were captured by using a multiple-camera match analysis system (AMISCO PRO®, version 1.0.2, Nice, France) and playing distances were computed post-event by specially developed software (Animation Mode AMISCO PRO®, Nice, France). The movement patterns of all 22 players were observed during the entire match by means of 8 stable, synchronised 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 were recorded on six computers for post-match analyses. (For previous applications of the AMISCO PRO®, see Dellal, Wong, Moalla, & Chamari, 2010; Di Salvo et al., 2007, Randers et al., 2010 and Zubillaga, Gorospe, Hernandez, & Blanco, 2009).

We conducted a pilot study prior to the final data collection procedure and found that the data collected at the frequency of 5 Hz was still useful provided that all data was collected when the ball was in play. To exclude the influence of set plays on players' positions, we decided to use the data collected from five seconds after the set play was taken. Kick off, throw in, goal kick, free kick, corner kick, and penalty kick were all considered as set plays. This was deemed adequate taken into consideration our study aims as well as the feasibility of the whole procedure.

Data were collected in two variables of *playing length* and *playing width*, across six ball locations, and from male and female matches. These playing distances were defined as the range (maximum - minimum) of all 20 outfield players' positioning in longitudinal direction (along the pitch or goal-to-goal) (playing length) as well as in lateral direction (across the pitch or side-to-side) (playing width) of the playing field (Figure 1). Depending on the position of the ball, all data corresponded to one of the six zones in which AMISCO PRO® divides the pitch (Figure 1).

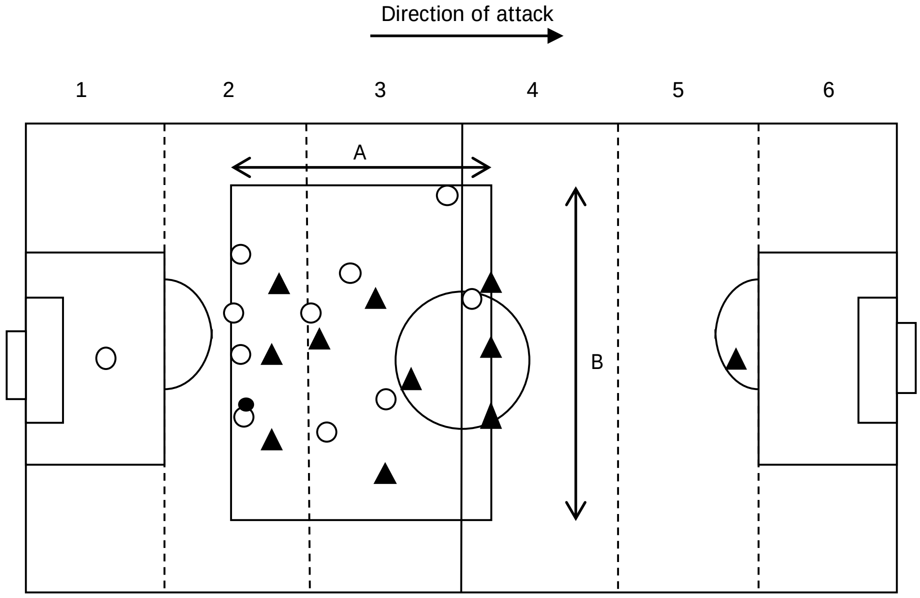

Figure 1. Measured distances of playing length (A) and playing width (B) and the six zones (1 - 6) indicating different locations of the ball on the pitch, determined by the team in possession of the ball (●).

2.3. Statistical analysis

The data for all variables used failed to satisfy the condition for normality ($P<0.05$) and also Levene's test of homogeneity of variances showed that data from two of the four variables failed to satisfy the condition of equal variances ($P<0.05$). Therefore, the nonparametric inferential procedures were deemed to be more appropriate and applied.

Friedman test was applied to compare the mean playing distances for the six pitch zones in each variable for male and for female matches, followed by a series of Wilcoxon Signed Ranks post hoc test where a significant different was found. Further, Mann-Whitney U post hoc test was used to compare pairs of mean playing distances between male and female matches in each variable. The P values of under 0.05 were used to indicate significant differences for Friedman tests. To avoid inflation of the maximum allowable probability of making a Type I error beyond 0.05, we determined a P value for each post hoc test by using an expression of α in terms of the number of pairwise comparisons (O'Donoghue, 2012). Therefore, we set statistical significance at $P<0.0034$ for Wilcoxon Signed Ranks post hoc tests and $P<0.0085$ for Mann-Whitney U post hoc tests. All statistical analyses were carried out using IBM SPSS Statistics-v.19.0 for Windows.

3. Results

Mean playing distances varied significantly across six ball locations regardless of sex and variable used (Table 1). Differences were found in *playing length* (χ^2_5=328.1 and 520.9, P<0.001) and *playing width* (χ^2_5=39.6 and 26.9, P<0.001) from male and female matches, respectively.

These variations of playing distances according to the six ball locations follow opposite patterns specific to each direction of the pitch and similar in both sexes. Mean distances of playing length tended to decrease as the ball moved towards the midfield (zones 3 and 4) from near-the-goal areas (zones 1, 2, 5 and 6), whereas distances of playing width displayed the opposite pattern as it became increasingly longer as the ball moved towards the midfield areas (Figure 2). The comparison between ball locations for both sexes showed playing length varied with significantly (P<0.0034) shorter mean distances when the ball was in zones 3 and 4 than in all other zones, whereas playing width varied with significantly (P<0.0034) longer mean distances when the ball was in zones 3 and 4 than in all other zones except only zone 2 (Table 1 and Figure 2). Non-significantly longer distances of playing width were still registered when the ball was in zones 3 and 4 compared to zone 2 in both male matches (zone 3: z=-0.1, P=0.911; zone 4: z=-0.5, P=0.629) and female matches (zone 3: z=-0.4, P=0.695) (Table 1 and Figure 2).

Table 1. Mean±s (in metres) of playing length and playing width according to the six different locations of the ball on the pitch in male (n=2575) and female (n=2756) matches (N=5331).

Ball location	Length		Width	
	Male	Female	Male	Female
Zone 1	42.39±5.83	43.31±7.55[†]	41.20±6.53	39.24±8.13
Zone 2	39.21±4.88	39.41±5.53[†]	43.89±8.29	42.42±8.48
Zone 3	36.88±4.41	37.41±5.74	44.79±10.13[b]	42.90±20.27[b]
Zone 4	35.91±4.95[c]	36.68±4.09[c]	44.93±8.34[bc]	41.80±8.00[bc]
Zone 5	38.73±4.62[b]	40.35±4.33[b]	42.22±7.91[a]	40.88±7.10[a]
Zone 6	46.09±4.33	48.11±3.93	40.82±6.05[ad]	40.39±8.35[ad]
P[*]	<0.001	<0.001	<0.001	<0.001

[*]Friedman test. Wilcoxon Signed Ranks post hoc tests showing differences (P<0.0034) between all ball locations except: No difference to [a]zone 1; [b]zone 2; [c]zone 3; and [d]zone 5. Mann-Whitney U post hoc tests showing differences (P<0.0085) between all pairs of male and female playing distances except: No difference to [†]male playing distance.

The comparison between mean playing distances from male and female matches showed consistent differences. There were significantly shorter (U=29247.5, z=-6.4, P<0.001) distances of playing length in male matches (maximum=46.09±4.33 m) than in female matches (maximum=48.11±3.93 m) in all ball locations except in zone 1 (U=24139.0, z=-1.9, P=0.056) and zone 2 (U=77081.0, z=-1.0, P=0.316). At the same time, male matches (maximum=44.93±8.34 m) produced significantly longer (U=128564.0, z=-8.2, P<0.001) distances of playing width than female matches (maximum=41.80±8.00 m) in all ball locations (Table 1 and Figure 2).

4. Discussion

This study aimed to explore patterns of game structure in male and female matches from elite soccer by using *playing distances* performed according to the six different ball locations on the pitch. Based on dynamic-system approach and the structural understanding of the game, it was expected that *playing length* and *playing width* would vary significantly according to ball location on the pitch. In addition, distances of *playing width* were expected to be longer when the ball is in the middle areas of the pitch compared to the areas near-the-goal and distances of the *playing length* were expected to be the opposite, with shorter distances when the ball is in the middle areas of the pitch than in the areas near-the-goal. Further, these opposite variations of playing distances were expected to follow similar patterns regardless of the sex, but with larger variations in male than female matches.

Taking into consideration spatial-temporal relations emerged from the collective movement of players of the two teams and different ball locations on the pitch, results of this study revealed systematic differences of *playing length* and *playing width* according to location of the ball on the pitch (Table 1) and in line with the structural understanding of the game.

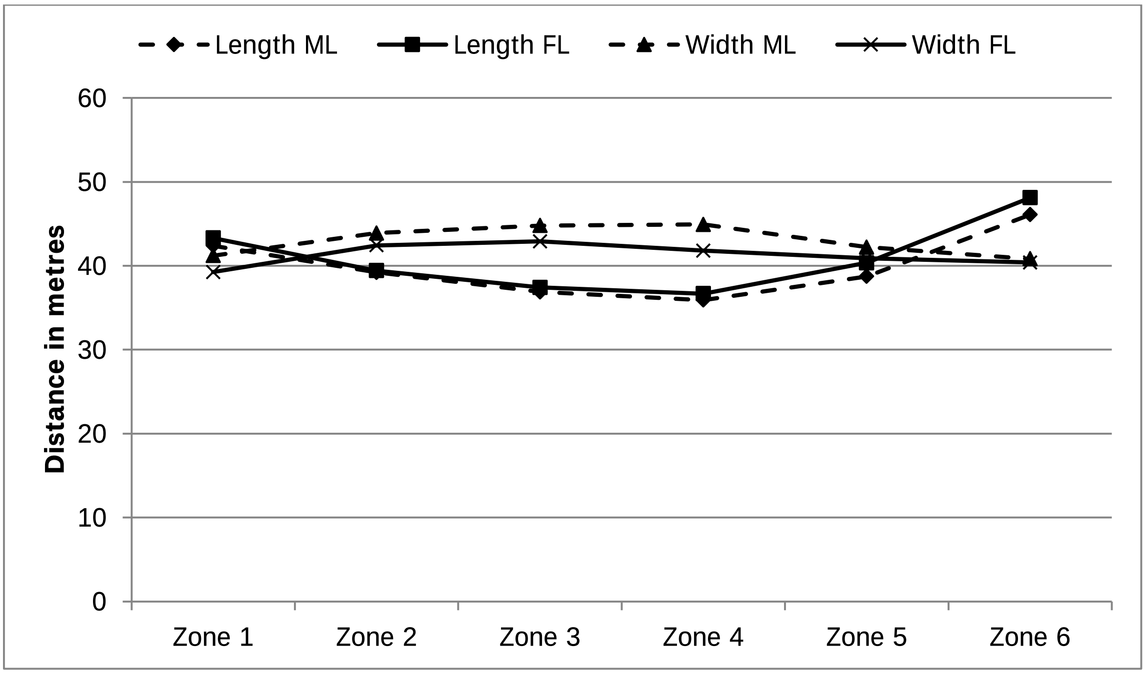

Figure 2. Graphical display of mean distances (in metres) showing playing length varied with *stretch-contraction-stretch* patterns and playing width varied with the opposite patterns of *contraction-stretch-contraction* across the six ball locations in male and female matches.

Both male and female matches displayed similar movements in *playing length* that vary with *stretch-contraction-stretch* patterns and in *playing width* that vary with opposite patterns of *contraction-stretch-contraction,* but these patterns varied to a significantly greater extent in male matches (Figure 2). This was the case for *playing length* especially when the ball was closer to the opponent's goal and for *playing width* at all ball locations especially in the midfield (Figure 2).

This study revealed that as the ball moved towards the midfield area from areas closer to the two goals the distance of playing length decreased, while the distance of the playing width increased. This can be explained as a result of the interaction between different phases of match play (Bangsbo & Peitersen, 2000) and the spatial-temporal demands of the match action (Gréhaigne et al., 1997). In a congested midfield area of the pitch where the *transition play* takes place the attacking teams tended to play increasingly wider (i.e. side-to-side stretch) and shorter (i.e. goal-to-goal contraction) in order to create space, at the same time increase opportunities for player-support. On the other hand, in the near-the-goal areas of the pitch where the *finishing phase of the play* often takes place the attacking teams tended to play increasingly narrower (i.e. side-to-side contraction) and longer (i.e. goal-to-goal stretch) in order to access favourable scoring positions in front of the goal, at the same time take precaution defensively by having one or more of its players remained standby around a halfway line. As players of the attacking teams performed these tactical movements on- and off-the-ball with the aim to outplay the opponent, players of the defending teams reacted by constantly reorganising themselves and move more or less synchronously with players of the attacking team in order to better oppose the opponent. Ultimately, the two opposing teams in fact seemed to form one single movement pattern (Elias & Dunning, 1966).

The patterns of movement in longitudinal (goal-to-goal) direction described above incorporate also the influence of the offside rule. The fact that the offside rule does not apply in own half of the pitch did restrict rearmost players of the attacking team from advancing farther forward beyond the halfway line when the ball was located closer to the opponent's goal. Instead at least one had to remain by the halfway line as a defensive precaution. Consequently, the distances of playing length became increasingly longer as the ball moved from the midfield in transition phase towards near-the-goal areas of the pitch where finishing phase of the play takes place.

According to a dynamic-system approach, a soccer match play emerges from the interplay of play and counter play produced by both teams in which the idea for each player is to cooperate with partners in order to better oppose the opponents either while attacking (keeping one's defence in mind) or while defending (getting ready to attack) (Gréhaigne et al., 1997). The fact that measured playing distances did emerge from the interplay of *play* (attacking team) and *counter play* (defending team) produced by both teams, opens for the possibility of identifying team movement patterns as the stretch-contraction-stretch and contraction-stretch-contraction patterns found in this study. Elsewhere, Yue et al. (2008a) reported also similar movement patterns when they observed that when a team contracted, a shape of the opposing team tended to expand and vice-versa to display what they referred to as expansion-contraction patterns. Also, a more recent study by Vilar et al. (2014) showed the effect of restricting playing space on skill performance in 5-a-side soccer games by reporting fewer opportunities to maintain ball possession on smaller pitches, compared to medium and larger pitches. The authors explained further that as the pitch dimensions decreased, the values of *interpersonal distance* as well as those of *time-to-contact* between attackers and defenders also decreased, creating a more difficult environment to keep-on possessing the ball.
The current study revealed further that the two identified patterns of playing distances were more evident in male than female matches. This was the case for *playing length* especially when the ball was closer to the opponent's goal and *playing width* at all ball

locations especially in the midfield. These results imply that female matches displayed less *length compactness* in their movement along the pitch, especially in finishing phase, as well as less *width utilization* across the pitch in all phases of match play, especially in transition phase at the midfield. In the structural understanding of the game (Olsen et al., 1994), good length compactness (offensive depth and defensive depth) and good width utilization (offensive width and defensive concentration) are referred to as the optimal offensive and defensive organization of other team players in relation to a player with the ball in respective directions along and across the pitch. Furthermore, good length compactness and good width utilization are considered as means to facilitate either achieving penetration (offensive) or preventing penetration (defensive) by contributing to either space creation and utilization (offensive) or preventing space creation and utilization (defensive). For optimal success, soccer teams employed specific playing systems or formations to facilitate the performance of good length compactness and good width utilization during match play (Wilson, 2009).

Olsen et al. (1994) explain further that good length compactness (offensive) is achieved when players in the attacking team organise themselves in positions that provide a player with the ball as many passing alternatives as possible. Good length compactness (defensive) involves optimal distances between defensive lines (last-, midfield- and front line) and also between the pressing player (first defender) and the backup player (second defender) that are neither too big nor too small, depending on the specific situation, to accomplish defensive duties successfully. Good width utilization (offensive) is achieved when players in the attacking team assume wide positions across the pitch to encourage defending players to open up before taking advantage and exploit spaces created in-between defending players to achieve penetration. On the other hand, good width utilization (defensive) involves squeezing immediate space in front of a player with the ball and refusing him or her from advancing forward, at the same time ensuring defensive support to a pressing defending player around the point of attack. Indeed, Folgado et al. (2014) have recently demonstrated higher level of tactical maturity in older teams compared to younger teams by showing a reduced variability of players' *length per width ratio*, suggesting a more consistent utilization of the width both offensively (stretching and creating space) and defensively (compressing into a confined area) in SSGs in youth soccer. Therefore, consistent with this understanding of the game, female matches can be interpreted to have had less opportunity for creating spaces in all phases of play and also less opportunity for passing alternatives especially in the finishing phase. This implies that female teams produced fewer opportunities for achieving penetrations in their match play. Thus, compared to male matches, it seems that female matches displayed less favourable patterns of game structure.

Similar results on synchronised displacement showing two competing teams tightly coupled with the movement of the ball in goal-to-goal direction, while a delay of about 2 seconds was observed in side-to-side direction (Yue et al., 2008b). Investigating the effect of training program on tactical behaviour in soccer SSGs, Sampaio and Maçãs (2012) also detected improved synchronised displacement in both longitudinal and lateral directions, with more effect registered in longitudinal direction. These researchers reported also tendencies in the teams' movement behaviour which suggest that player's movement patterns are more constrained by their teammates positioning than by the location on the pitch. In another study on futsal, teams' synchronised behavioural patterns were also detected in both lateral and longitudinal directions, but more so between teams and a ball than between two opposing teams (Travassos et al., 2013). These results support our finding on the influence of ball location by demonstrating that during match play teams do indeed integrate ball trajectory information to coordinate actions to achieve their objectives. However, Duarte et al. (2012) and Frencken and Lemmink (2008) reported general tendencies of synchronised displacements of two opposing teams in longitudinal direction but not in lateral direction for SSGs in soccer.

The present study has some limitations which may have influenced the results. These include unbalanced number of home versus away teams, data from relatively old matches (O'Donoghue, 2010), and the fact that all the matches included were only from the Spanish top professional soccer leagues. Consequently, the results obtained could be a reflection of the past playing standard or style in these particular teams and leagues and, therefore, care should be taken when extrapolating the results to other playing standards or soccer leagues in current soccer. Nevertheless, analysis of *playing distances* according to the ball location seems to be potentially useful in studying patterns of game structure in real matches and it should be further explored in future. Future large-scale studies could explore further findings of the present study by considering playing length and playing width for attacking and defending teams separately during real soccer matches. As mentioned earlier, differences in game behaviour between attacking and defending teams related to ball dynamics have been reported in futsal (Travassos et al., 2013) and in a single match of full-sized soccer (Yue et al., 2008b). Also, further investigation is required in order to find out how changes in levels and styles of play, different situational variables and developments in current soccer affect game structure. Duarte et al. (2014) have for example reported the influence of defensive playing styles on collective movement patterns in lateral direction based on a small-scale study involving two 5-a-side soccer games.

Some practical implications can be established from the current findings. Information on patterns of game structure specific to different phases of match play obtained from real matches could be used to facilitate the improvement of tactical match performance for all teams with lower levels of collective movement skills. Kennekens et al. (2011) found that knowledge involved in the interpretation of a specific match situation and the ability to be on the right place at the right time to make the right action appears to be the factor that best differentiates between more and less successful future soccer players. Moreover, the empirical evidence for sex differences in patterns of game structure found in this study may facilitate to improve female soccer teams' tactical match performance and create more opportunities for achieving penetrations. The current findings identified the improvement potential and suggest female soccer teams to consider playing with increased *length compactness* in their movement along the pitch, especially in finishing phase, and also with more *width utilization* across the pitch in all phases of match play, especially in transition phase at the midfield. The ability to use pitch width especially at high playing tempo was suggested to be a high-level of tactical expertise closely linked with playing effectiveness in soccer (Sampaio & Maçãs, 2012).

5. Conclusions

The findings from the current study revealed systematic differences in emergent patterns of game structure in male and female soccer matches. Mean distances of *playing length* and *playing width* varied according to location of the ball on the pitch and in line with the structural understanding of the game. Both male and female matches displayed similar movements in *playing length* that vary with *stretch-contraction-stretch* patterns and in *playing width* that vary with opposite patterns of *contraction-stretch-contraction*, but these patterns varied to a significantly greater extent in male matches. This was the case for *playing length* especially when the ball was closer to the opponent's goal and for *playing width* at all ball locations especially in the midfield. This implies less opportunity for creating spaces in all phases of play and also less opportunity for passing alternatives especially in the finishing phase in female matches. Hence, with fewer opportunities for achieving penetrations, female matches seem to display less favourable patterns of game structure compared with their male counterpart. The improvement potential was therefore identified and that female soccer teams were suggested to consider playing with increased *length compactness* in their movement along the pitch, especially in finishing phase, and also with more *width utilization* across the pith in all phases of match play, especially in transition phase at the midfield. Thus, this study demonstrates that the analysis of playing distances according to the ball location is potentially useful in studying patterns of game structure in real soccer matches and it should be further explored in future.

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