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ORIGINAL ARTICLE

## Comparison of physical and technical performance in European soccer match-play: FA Premier League and La Liga

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### Abstract

The aim of this study was to compare match performance in professional soccer players across two major European championships: Spanish La Liga and English FA Premier League (FAPL). Data were collected using a computerized match analysis system. A total of 5938 analyses were recorded during the 2006–2007 season. The players were classified into six positional roles: central defenders, full backs, central defensive midfielders, wide midfielders, central attacking midfielders, and forwards. The match performance variables analysed included: (i) physical activity – total distance covered, distances covered at high-intensities both with and without possession of the ball; (ii) technical actions – heading and ground duels, passing, time in possession, and ball touches. Comparison of the total distance covered by FAPL and La Liga players showed no difference across individual playing positions but FAPL players generally covered greater distances in sprinting. In contrast, more of the total distance in sprinting was covered by La Liga players when their team was in possession (values from  $P < 0.05$  to  $P < 0.001$ ), while an equal total sprint distance, irrespective of possession, was observed in FAPL players. La Liga players won more heading duels (49.32% vs. 48.68%) and performed the same proportion of successful passes (76.17%). FAPL wide midfielders had ~20% more ball touches per possession than their La Liga counterparts ( $2.24 \pm 0.54$  vs.  $2.03 \pm 0.55$ ,  $P < 0.001$ ). In conclusion, our results show that FAPL and La Liga teams present differences in various physical and technical aspects of match-play, suggesting that cultural differences may exist across professional soccer leagues and playing positions.

**Keywords:** Football, motion analysis, technique, sprinting, notational analysis

### Introduction

Over the last four decades, several methods have been developed to evaluate player performances during soccer match-play (Bangsbo, Norregaard, & Thorso, 1991). The subjective estimation methods used to analyse movement in professional soccer match-play are being replaced by semi-automatic computerized player tracking technologies (Barros et al., 2007; Bradley et al., 2009; Di Salvo, Gregson, Atkinson, Tordoff, & Drust, 2009). These contemporary systems allow collection of a larger range of

performance data both more quickly and accurately than visual estimation methods (Drust, Atkinson, & Reilly, 2007). They also provide a simultaneous analysis of the physical efforts, movement patterns, and technical actions of players while allowing a comparison of performance with and without the ball, which is not always possible when using visual estimation (Carling, Bloomfield, Nelsen, & Reilly, 2008).

The physical profile of the contemporary player in professional match-play has been well described, especially in relation to individual playing positions.

Research has generally shown that central defenders cover the least distance while midfielders run the greatest distances (Mohr, Krustup, & Bangsbo, 2003; Rampinini, Coutts, Castagna, Sassi, & Impellizzeri, 2007). In terms of high-intensity efforts, wide midfielders cover more distance and have less recovery time between these efforts compared with the other positions (Bradley et al., 2009; Di Salvo et al., 2009). However, most of this research has simply quantified the physical activity profiles of players in one specific championship and a direct comparison of performance between professional leagues has rarely been done (Dellal, Ignatowicz, & Dyon, 2009; Dellal, Wong, Moalla, & Chamari, 2010; Rienzi, Drust, Reilly, Carter, & Martin, 2000). Indeed, an objective comparison of player performance across different leagues using the results of previously published motion analyses studies is difficult due to the use of different data collection methods and threshold values for categories of movement intensity (Barros et al., 2007; Di Salvo et al., 2009). The use of the same motion analysis system to compare physical activity profiles between leagues would maximize objectivity, accuracy, and practical usefulness because the calculation methods and definition of movements would be the same (Drust et al., 2007). However, obtaining sufficient comparative data can be difficult, since clubs across different championships may not use the same analysis system and may not be willing to share data.

Previous studies using semi-automatic video match analysis have provided valuable information on physical performance but have generally neglected the accompanying technical demands (Rampinini, Impellizzeri, Castagna, Coutts, & Wisloff, 2009; Taylor, Mellalieu, James, & Shearer, 2008). A direct comparison of both physical and technical performance between equivalent leagues would be useful in determining whether game performance is general to all leagues or if each league has its own specific playing characteristics. It might also aid teams in their understanding of opposition performance and when preparing to compete in the UEFA Champions League or Europa League. In a related study, a detailed analysis of physical profiles in professional soccer players across four European Leagues was carried out by Bloomfield, Polman, Butterly, & O'Donoghue (2005). Results showed substantial variations in stature, body mass, and body mass index that led the authors to speculate that there are different physical demands in each league. The provision of objective data from match analysis on physical and technical performance would help to identify if these differences exist and subsequently aid in tailoring position-specific training regimes that are suitable for each respective league.

The objective of this investigation was to provide a comparative analysis of physical and technical demands of professional soccer match-play across two European leagues: the English FA Premier League (FAPL) and the Spanish La Liga. Our aim was to furthering our understanding of the general physical and technical requirements of professional soccer in general, as well as those of two major European leagues in particular.

## Methods

A total of 5938 observations of match performance were analysed across La Liga ( $n=1896$ ) and the FA Premier League (FAPL) ( $n=4704$ ). Data were collected from 600 matches played over the 2006–2007 season using the same multiple-camera match analysis system (Amisco Pro<sup>®</sup>, Sport-Universal, Nice, France). In each stadium, eight stable cameras were positioned and subsequently calibrated and synchronized. Signals and angles obtained by the encoders were sequentially converted into digital data and recorded on six computers for post-game analysis. The movements of every player over the course of matches were tracked using a sampling rate of 25 Hz. Operators experienced in video match-analysis simultaneously coded each player action involving the ball. Physical and technical performance from the raw data file was determined automatically by computerized analysis of player movements and actions using match-analysis software (AMISCO Viewer<sup>®</sup>, Sport-Universal, Nice, France). The workings, accuracy, and reliability of the AMISCO Pro<sup>®</sup> system in measuring player movements and coding game events in professional soccer competition have been described in more detail elsewhere (Carling et al., 2008; Di Salvo et al., 2007; Zubillaga, 2006; Zubillaga, Gorospe, Hernández-Mendo, & Blanco-Villanesor, 2008).

The performance profiles of players according to their individual positional role were determined. The number of performance observations for six positional roles were as follows: central defenders,  $n=2328$ ; full backs,  $n=344$ ; central defensive midfielders,  $n=1972$ ; wide midfielders,  $n=150$ ; central attacking midfielders,  $n=158$ ; and forwards,  $n=986$ .

The total distance covered by players was measured. Two thresholds were used to evaluate the distances run in two categories of running at high intensity: 21–24 km·h<sup>-1</sup> (high-intensity running) and >24.1 km·h<sup>-1</sup> (sprinting). These speed categories are similar to those used in other studies using the same analysis system (Carling & Bloomfield, 2010; Dellal et al., 2010; Di Salvo et al., 2007). The physical efforts of players were calculated according to whether their team was in (attacking play) or not in (defensive play) possession of the ball.

The technical parameters monitored included: number and percentage of successful passes, number of forward passes, individual time spent in possession of the ball, mean number of ball touches by individual players for each possession, and number and percentage of successful heading and ground duels (one-on-one situations such as heading and tackling actions in which players were competing for possession).

All values are expressed as means  $\pm$  standard deviations. The normality distribution of the data was checked using the Kolmogorov-Smirnov test and homogeneity of variance was provided assessed by the Hartley test. A two-way analysis of variance (ANOVA) with repeated measures was used to compare the distance covered according to two factors: playing position (central defender, full back, central defensive midfielder, wide midfielder, central attacking midfielder, and forward) and the distance run in two categories of running at high intensities ( $21\text{--}24\text{ km}\cdot\text{h}^{-1}$  and  $>24.1\text{ km}\cdot\text{h}^{-1}$ ). For technical performance, a one-way ANOVA was used to compare the technical aspects according to playing position. Independent-sample *t*-tests were used to explore differences between FAPL and La Liga players. Significant main effects of each factor were followed-up with *post hoc* Bonferroni-corrected multiple comparisons. Statistical significance was set at  $P < 0.05$ . Effect sizes (ES) for significant differences in distances run between the two leagues were also determined. Effect size values of 0.2, 0.5, and  $>0.8$  were considered to represent small, medium, and large differences, respectively (Cohen, 1988).

## Results

### *Physical performance*

**Total distance covered.** Comparison of the total distance covered across playing positions showed no difference between FAPL and La Liga players except for central attacking midfielders ( $P < 0.01$ ,  $ES = 0.8$ ). *Post hoc* analyses showed that central defenders, full backs, and forwards (in ascending order) covered the least total distance in both leagues (Table I). Lower values ( $P < 0.05$ ) were obtained for central defenders, full backs, and forwards compared with central defensive midfielders, who covered the greatest total distance.

**High-intensity running.** Table I presents data on distance covered in high-intensity running ( $21\text{--}24\text{ km}\cdot\text{h}^{-1}$ ). In both leagues, central defenders covered the least total distance in high-intensity running ( $P < 0.001$ ), but FAPL central defenders covered more distance than their La Liga counterparts

( $P < 0.05$ ,  $ES = 0.3$ ). La Liga central defensive and central attacking midfielders covered less distance in high-intensity running than their FAPL counterparts ( $P < 0.001$ ,  $ES = 0.9$  and  $ES = 0.6$  for central attacking midfielders and central defensive midfielders respectively). Wide midfielders and full backs in the FAPL ran a greater percentage of the total distance covered at high intensities than their La Liga counterparts ( $P < 0.05$  and  $P < 0.01$  respectively). In contrast, FAPL central defensive and central attacking midfielders recorded a lower percentage of distance run at high intensities than their La Liga counterparts (FAPL vs. La Liga: 2.5% vs. 2.9% of high-intensity running for central defensive midfielders,  $P < 0.001$ ; 2.5% vs. 3.1% of high-intensity running for central attacking midfielders,  $P < 0.001$ ).

During defensive play, central defenders, full backs, central defensive midfielders, and wide midfielders in La Liga ran a significantly greater total distance in high-intensity running than during attacking play ( $P < 0.001$  for central defenders, full backs, and central defensive midfielders;  $P < 0.01$  for wide midfielders) (Table I). The efforts made during defensive and attacking play demonstrated similar patterns across players irrespective of positional role or championship, except for wide and central attacking midfielders. Wide midfielders in the FAPL ran greater distances in high-intensity running when their team was in possession of the ball, whereas the opposite was observed for LIGA wide midfielders. Central attacking midfielders in the FAPL covered similar distances in high-intensity running in both defensive and attacking play, whereas central attacking midfielders in La Liga covered a higher total distance in attacking play ( $P < 0.001$ ).

**Sprinting.** Analysis of the distances covered in sprinting ( $>24.1\text{ km}\cdot\text{h}^{-1}$ ) showed a similar trend in both leagues, in that central defenders covered the least distance while sprinting whereas forwards sprinted the greatest distance ( $P < 0.001$ ) (Table I). However, players across all playing positions in the FAPL covered greater distances in sprinting than their La Liga counterparts ( $ES = 0.2\text{--}0.7$ ). Of the total distance covered, FAPL full backs, central defensive midfielders, central attacking midfielders, and forwards ran a greater percentage of total distance covered while sprinting than their La Liga counterparts ( $P < 0.05$  for full backs and forwards,  $P < 0.001$  for central defensive midfielders and central attacking midfielders). Sprint activities ranged from 1.8% to 2.6% of the total distance covered. La Liga players covered more of their total sprint distance when their team was in possession compared with not in possession ( $P < 0.001$  for

Table I. Comparison of physical and technical characteristics of match-play in professional soccer players in the FA Premier League (FAPL) and La Liga (mean values with standard deviations in parentheses)

	Central defender		Full back		Central defensive midfielder		Central attacking midfielder		Wide midfielder		Forward	
	La Liga (n=624)	FAPL (n=1704)	La Liga (n=212)	FAPL (n=132)	La Liga (n=616)	FAPL (n=1356)	La Liga (n=82)	FAPL (n=76)	La Liga (n=100)	FAPL (n=50)	La Liga (n=262)	FAPL (n=724)
Total distance covered (m)	10496.1 (772.0)	10617.3 (857.9)	10649.7 (786.2)	10775.3 (645.9)	11247.3 (913.8)	11555.6 (811.2)	11004.8** (1164.2)	11779.5 (705.9)	11240.8 (761.8)	11040.8 (757.0)	10717.7 (901.4)	10802.8 (991.8)
Total sprint distance covered (m)	193.6* (64.6)	208.5 (69.4)	248.9** (77.4)	263.0 (69.9)	203.3*** (76.4)	245.8 (77.9)	222.2*** (66.5)	267.3 (64.2)	250.8 (71.5)	259.2 (84.9)	260.0* (72.6)	278.2 (78.0)
Total sprint distance, in possession	47.0 (39.4)	62.1 (44.4)	99.3 (49.5)	127.1 (51.0)	93.3 (58.7)	122.2 (59.9)	138.1\$\$\$ (52.0)	122.7 (46.4)	137.5\$\$\$ (51.5)	169.0\$\$\$ (78.5)	181.1\$\$\$ (57.4)	183.0\$\$\$ (63.3)
Total sprint distance, not in possession	133.4### (44.1)	136.7### (46.6)	140.7### (50.7)	129.3 (41.5)	103.3# (41.5)	116.4 (44.3)	71.9 (35.0)	126.6 (40.1)	105.1# (41.9)	84.3 (34.8)	68.1 (30.2)	84.8 (37.7)
Percentage of the total distance covered in sprinting	1.8	1.8	2.3*	2.5	1.8***	2.2	2.0***	2.5	2.2	2.2	2.4*	2.6
Total distance covered in high-intensity running (HIR) (m)	226.1* (53.8)	240.8 (63.9)	284.8** (54.7)	270.1 (55.0)	279.6*** (66.2)	319.1 (67.7)	278.0*** (61.0)	334.0 (60.7)	310.6** (67.0)	298.0 (62.4)	288.6 (56.1)	299.8 (63.7)
Total HIR distance, in possession	51.3 (29.8)	67.5 (38.0)	93.0 (35.1)	106.2 (38.4)	106.3 (46.4)	143.0 (50.1)	170.8\$\$\$ (52.7)	160.6 (45.4)	143.5 (48.2)	152.7\$\$ (50.9)	178.2\$\$\$ (40.0)	181.0\$\$\$ (47.2)
Total HIR distance, not in possession	144.1### (37.8)	157.0### (40.6)	175.0### (40.0)	150.0### (39.4)	157.4### (46.1)	162.5## (41.9)	94.2 (37.3)	160.8 (43.5)	152.7# (42.6)	137.5 (40.7)	93.0 (32.2)	101.4 (37.9)
Percentage of the total Distance covered in HIR	2.1	2.2	2.5*	2.7	2.9***	2.5	3.1***	2.5	2.5**	2.8	2.8	2.7

Significant difference between La Liga and FAPL: \* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$ .

Significantly higher value for the total distance covered in sprinting when their team was in possession (attacking play): \$ $P < 0.05$ , \$\$\$ $P < 0.001$ .

Significantly higher value of the total distance covered in sprinting when their team was not in possession (defensive play): # $P < 0.05$ , ## $P < 0.01$ , ### $P < 0.001$ .

central defenders, full backs, central attacking midfielders, wide midfielders, and forwards; and  $P < 0.05$  for central defensive midfielders). However, contrasting results were reported in FAPL players, as they covered a similar total distance in sprinting irrespective of possession or not (full backs, central defensive midfielders, and central attacking midfielders) (Table I).

#### *Technical performance*

Defenders (full backs and central defenders) across both leagues won the highest proportion of heading and ground duels ( $P < 0.001$ ) (Table II). Central attacking midfielders and forwards recorded the lowest percentage of heading duels won ( $P < 0.001$ ), but La Liga forwards won more heading duels than FAPL forwards ( $P < 0.001$ ). The different positions across the midfield (central defensive midfielders, wide midfielders, and central attacking midfielders) showed no difference in percentage of ground duels won. When comparing the different playing positions across the FAPL and La Liga, the results did not demonstrate any difference in the percentage of ground duels won.

The percentage of successful passes ranged from 70% to 81% (Table II) with no difference between the two leagues across playing positions except for La Liga forwards, who successfully performed more passes than their FAPL counterparts ( $P < 0.05$ ). In both leagues, central defenders recorded the least total time spent in individual ball possession ( $P < 0.001$ ). Central attacking midfielders in La Liga spent the most time in individual ball possession ( $P < 0.01$  vs. FAPL central attacking midfielders;  $P < 0.001$  vs. the other positions), whereas in the FAPL the highest values were recorded by central attacking midfielders and wide midfielders ( $P < 0.001$ ). The number of ball contacts per possession was similar for central defenders, full backs, central defensive midfielders, and central attacking midfielders in both La Liga and the FAPL but differed for wide midfielders and forwards. Wide midfielders in the FAPL had ~20% more ball contacts per possession than their La Liga counterparts ( $P < 0.001$ ), while forwards in La Liga had a higher number of ball contacts than their FAPL counterparts ( $P < 0.001$ ).

#### **Discussion**

The various demands of elite soccer performance have been frequently described in the scientific literature. However, there is a lack of studies attempting to address cultural differences in physical match performance especially between various professional leagues while using the same method of

analysis and definitions of movement speed. In addition, evaluation of physical performance should also take into account the technical demands of match-play. The aim of this investigation, therefore, was to compare physical and technical performance in competitive match-play between two major European soccer championships. The results demonstrate that specific technical and physical demands exist in the two leagues and notably across individual positional roles. It is hoped that our results will contribute to the prescription of individualized training and preparation strategies.

Results from the present investigation showed that FAPL and La Liga players covered total distances ranging from 10496 m to 11779 m, which are generally within the range of those reported in players across other professional leagues (Carling et al., 2008; Dellal et al., 2010; Di Salvo et al., 2009), indicating that a certain degree of aerobic endurance is essential in professional soccer in England and Spain. The comparison across all playing positions generally identified no overall difference between leagues in total distance covered, although central attacking midfielders in the FAPL covered around 6.6% (775 m) more ground than their La Liga counterparts. Therefore, the total distance covered by players may not be considered an important discriminator of performance across different leagues. These findings partly contrast with research by Rienzi et al. (2000), who presented evidence that the overall distance covered by South American professional players was about 1000 m less than by players in the FAPL. It was suggested that the higher sustained pace of FAPL players could explain this disparity across the populations, although the authors did not distinguish between playing positions as was done in this study.

One noteworthy finding in this study was the significant differences in total distance run across midfield roles. Previously, central midfielders were shown to cover higher overall distances than wide midfielders (Di Salvo et al., 2007). However, the present study was the first to differentiate central midfield players into specific defensive and attacking roles. The fact that central defensive midfielders ran substantially greater overall distances than central attacking midfielders, especially in the FAPL, is therefore noteworthy. The tactical duties of central defensive midfielders are different from those of central attacking midfielders, and the present results suggest that the former are subject to greater overall exertion and may need higher fitness. The greater distances covered by the present central defensive midfielders in the FAPL may be related to the playing styles and/or team formations commonly employed in this league. A study linking physical

Table II. Technical characteristics of players in the FA Premier League (FAPL) and La Liga (mean values with standard deviations in parentheses)

	Central defender		Full back		Central defensive midfielder		Central attacking midfielder		Wide midfielder		Forward	
	LIGA (n=624)	FAPL (n=1704)	LIGA (n=212)	FAPL (n=132)	LIGA (n=616)	FAPL (n=1356)	LIGA (n=82)	FAPL (n=76)	LIGA (n=100)	FAPL (n=50)	LIGA (n=262)	FAPL (n=724)
Percentage of successful passes	77.00	75.00	79.00	81.00	78.00	77.00	78.00	80.00	77.00	80.00	74.00	70.00
Number of passes towards the opponent's goal	15.32 (4.49)	15.16 (4.52)	18.28 (4.93)	20.30 (4.28)	14.13 (4.14)	14.52 (3.90)	13.42 (3.99)	13.06 (3.40)	14.44 (4.34)	14.46 (4.00)	6.52** (2.60)	7.79 (3.05)
Number of ball Possessions	43.40 (9.70)	41.22 (10.10)	54.38** (10.70)	58.88 (8.90)	53.60 (9.80)	53.22 (9.50)	60.96* (9.20)	57.12 (8.30)	55.30 (9.70)	56.24 (8.90)	41.52 (7.20)	43.04 (7.60)
Total duration of ball possession (s)	43.89 (14.20)	41.72 (15.40)	54.40** (15.60)	59.76 (13.80)	63.61* (17.09)	60.76 (16.20)	84.04*** (17.40)	76.09 (18.40)	67.23*** (18.00)	77.85 (22.40)	55.87 (16.30)	54.19 (16.00)
Number of touches per possession	1.76 (0.34)	1.74 (0.39)	1.79* (0.32)	1.84 (0.79)	2.03 (0.45)	2.01 (0.41)	2.26 (0.43)	2.24 (0.45)	2.03*** (0.55)	2.24 (0.54)	2.16** (0.54)	2.01 (0.55)
Total heading duels	4.6*** (1.9)	14.9 (2.8)	3.3*** (1.6)	10.7 (2.2)	4.1*** (2.0)	8.2 (1.9)	2.5*** (1.3)	6.7 (2.5)	2.7*** (1.6)	8.6 (2.1)	6.3*** (3.0)	18.5 (6.9)
Percentage success in heading duels	59.44	61.89	61.48	59.41	48.99	47.55	40.19	39.21	46.46*	49.05	39.38**	34.98
Total ground duels	7.2*** (3.0)	19.8 (3.5)	6.9*** (2.9)	24.2 (3.6)	11.0*** (4.1)	30.2 (4.9)	12.7*** (4.3)	30.7 (4.9)	8.9*** (3.5)	27.2 (3.9)	12.4*** (4.2)	28.8 (4.8)
Percentage success in ground duels	56.04	55.84	54.20	55.42	50.13	49.96	50.75	50.74	49.66	49.67	47.70	46.61

Significant difference between La LIGA and FAPL: \* $P < 0.05$ , \*\* $P < 0.01$ , \*\*\* $P < 0.001$ .

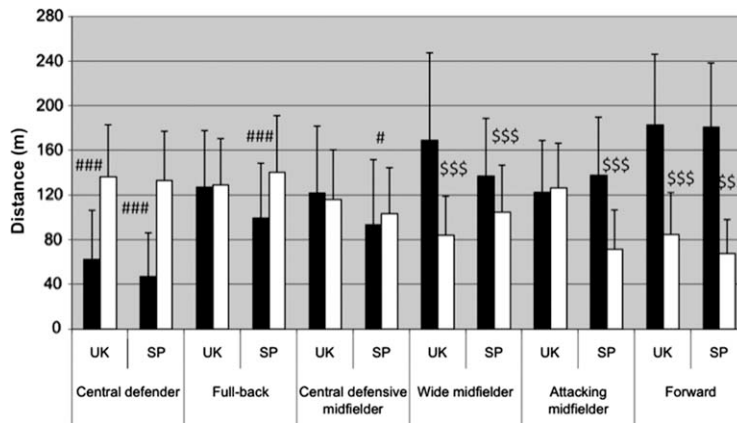


Figure 1. Sprint ( $>24 \text{ km} \cdot \text{h}^{-1}$ ) activity across playing positions in the FA Premier League (FAPL) and La Liga (LIGA) according to team ball possession: ■, in possession; □, not in possession. Significantly greater total distance covered in sprinting when their team was in possession:  $^{\$ \$ \$}P < 0.001$ . Significantly greater total distance covered in sprinting when their team was not in possession:  $^{\#}P < 0.05$ ,  $^{\# \# \#}P < 0.001$ .

efforts and positional roles with these factors is thus warranted. Nevertheless, on the basis of these findings, the present authors suggest that data from future analyses of match performance should be interpreted according to the precise tactical role of the midfielder.

High-intensity running efforts are a crucial element in elite soccer performance (Di Salvo et al., 2009). In the present study, high-intensity running and sprinting accounted for 3.9% and 5.3% of the total distance covered respectively, whereas in other professional leagues the high-intensity activity profile of players during match-play ranges from 6.1% to 13.5% of total distance covered (Barros et al., 2007; Bradley et al., 2009; Rampinini et al., 2007). However, the comparative analysis revealed that FAPL players performed a substantially greater total distance in high-intensity running than La Liga players irrespective of playing position. This result is in contrast with the observations of Bradley

et al. (2009) when comparing their results in FAPL players with those from studies on other elite playing populations. Similar distances covered in high-intensity efforts were observed in FAPL players and their equivalents in the Italian and Spanish leagues (Bradley et al., 2009; Rampinini et al., 2007). Differences in the data collection methods employed could explain the discrepancy between studies. It may also be that the present results uphold the common belief that the FAPL game is traditionally played at a much faster pace than in other leagues (Rienzi et al., 2000). Nevertheless, further investigations are necessary to determine whether other elements of high-intensity performance such as mean sprint distance or duration and recovery time between efforts also differ between players from elite leagues.

In both leagues, forwards were shown to cover the greatest distances in high-intensity work, whereas central defenders and central defensive midfielders

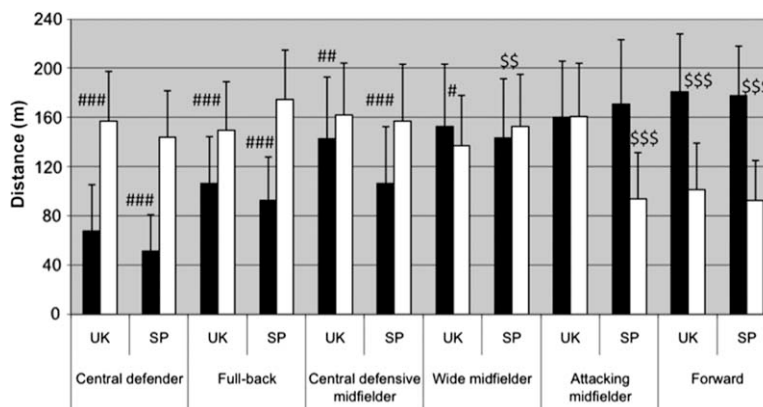


Figure 2. High-intensity running ( $21\text{--}24 \text{ km} \cdot \text{h}^{-1}$ ) activity across playing positions in the FA Premier League (FAPL) and La Liga (LIGA) according to team ball possession: ■, in possession; □, not in possession. Significantly greater total distance covered in high-intensity running when their team was in possession:  $^{\$ \$}P < 0.01$ ,  $^{\$ \$ \$}P < 0.001$ . Significantly greater total distance covered in high-intensity running when their team was not in possession:  $^{\#}P < 0.05$ ,  $^{\# \#}P < 0.01$ ,  $^{\# \# \#}P < 0.001$ .



covered the least distances respectively. Differences across positions are most likely a direct consequence of the tactical role of these positions within the team (Mohr et al., 2003). This result is in contrast with the general consensus that wide midfielders cover the most distance in high-intensity work (Carling et al., 2008), although similar distances were recently reported in FAPL wide midfielders (Di Salvo et al., 2009). While different methods of observation and variations in the classification of movements may once again account for the differences between studies, other factors such as the opposition, environmental factors or importance of games may have played a part. Nevertheless, differences in physical performance across playing positions suggest that specific high-intensity conditioning regimes may be more beneficial for certain individuals within the team formation. Intermittent exercises, repeated-sprint drills, and small-sided games are commonly used to improve aerobic performance and aid recovery time between sprints (Dellal et al., 2008; Dupont, Akakpo, & Berthoin, 2004).

The differentiation between high-intensity activity with or without ball possession enables the relative effectiveness of high-intensity efforts in relation to crucial match actions to be evaluated (Di Salvo et al., 2009). The analysis of these efforts according to ball possession showed that physical activity in both leagues was substantially different across midfield playing positions. In La Liga, for example, central attacking midfielders covered the most distance in high-intensity running when their team was in possession, whereas this was the case for wide midfielders in the FAPL. This result suggests that position-specific high-intensity training in midfield players should be tailored not only to the individual tactical role of the player but also to the specific demands of the league in which the player performs. However, similar physical activity patterns were reported in other positions across both leagues (e.g. central defenders, forwards) in both attacking and defensive play, implying that there are elements of physical performance common to certain positions in both leagues.

The technical analysis of match-play showed similar characteristics in passing performance in La Liga and FAPL players. Players in both of these leagues need to achieve a success rate between 70% and 81% in passing the ball (Table I). However, forwards in La Liga attained better success rates when passing than forwards in the FAPL, who also were the least successful across all positions. Further research is necessary to understand the reasons for this disparity and to inform ways in which this element of match performance can be improved.

Forwards in both leagues played substantially fewer passes towards the opponent's goal compared with the other positions. This disparity may be due to the specific role of centre forwards, as these players often have their back to goal during link-up play. Similarly, central defenders, central defensive midfielders, and central attacking midfielders across both leagues also demonstrated comparable patterns in terms of the total duration in possession and number of ball contacts. In contrast, FAPL full backs and wide midfielders had substantially more ball possessions than their La Liga counterparts, while La Liga forwards touched the ball more per possession than their FAPL counterparts despite spending a similar time in possession. Central attacking midfielders in La Liga spent the greatest total time in possession, whereas wide midfielders did so in the FAPL. These results suggest that the technical demands in ball possession differ significantly across certain playing positions in these two countries.

Finally, analysis of the won and loss percentage in heading and ground duels showed that certain playing positions in each country (notably defenders) were generally more successful in these actions than others (Table I). This result probably reflects the specific training done to respond to the demands of playing in defensive positions. In addition, it could be also because the modern attacking players are generally shorter than defenders (Wong et al., 2008). Somewhat surprisingly, however, forwards in the FAPL lost a greater percentage of heading duels than their La Liga counterparts. This may be due to the better heading ability of FAPL defenders, as the requirement for success in these actions is inherent to counter the direct playing style using long aerial passes frequently observed in the FAPL game (Carling, Williams, & Reilly, 2005).

## Conclusion

The findings of this study show both similarities and differences in various aspects of physical and technical performance between two major European soccer leagues with variations dependent upon playing position. This information has enabled a more thorough understanding of the physical and technical requirements for playing in La Liga and the FA Premier League and may have direct consequences for specific training regimens and talent identification schemes. These cultural differences in performance may also have an impact on transfers, as they suggest that players moving between countries need to adapt both physically as well as technically to the particular style of these leagues. Further studies examining the physical, technical, and tactical

aspects of performance and across a wider range of professional leagues are warranted.

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