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Influences of playing position and quality of opposition on standardized relative distance covered in domestic women's field hockey: Implications for coaches

ABSTRACT

The purpose of this study was to compare the standardized relative distance covered by the various playing positions (defenders, midfielders and forwards) against different quality of opponents in domestic women's field hockey. Data were collected from 13 individuals competing for one team in the English Premier League across an 18-game season. Data were collected via portable global positioning system technology. Distance data were grouped into six speed zones relative to individual players' maximum sprint speeds and then standardized by dividing by the number of on-pitch minutes. Dependent variables included distance covered in the six speed zones, as well as the number of sprints and repeated sprint efforts completed in the highest speed zone. Participants covered a significantly greater total distance when competing against opponents from top three teams compared to middle three teams (111.78 ± 2.65m·min^{-1} vs. 107.35 ± 2.62m·min^{-1} respectively). This was also true for distance covered in Zone 4 (running) (29.47 ± 1.69m·min^{-1} vs. 27.62 ± 1.45m·min^{-1}, respectively) and Zone 5 (fast running) (23.42 ± 1.76m·min^{-1} vs 21.52 ± 1.79m·min^{-1}, respectively). Defenders (99.77 ± 4.36m·min^{-1}) covered significantly less total metres per minute than midfielders (117.20 ± 4.36 m·min^{-1}) and completed significantly fewer Repeated Sprint Efforts per on-pitch minute (0.21 ± 0.03; 0.33 ± 0.03 respectively). Midfielders covered significantly less distance in Zone 2 (walking) than forwards (19.38 ± 1.64m·min^{-1}; 30.33 ± 2.12m·min^{-1} respectively). Conversely, midfielders were shown to cover significantly more distance in Zone 3 (jogging) than forwards (32.84 ± 1.10m·min^{-1}; 24.61 ± 1.42m·min^{-1} respectively). A standardized and relative assessment may be useful for coaches' and performance analysts' understanding of players' performance in different positions or against different quality opponents.

Key words: GPS, opposition ranking, sprinting, repeated sprint efforts, work rate.

INTRODUCTION

The use of global positioning systems (GPS) in competitive sporting environments has increased substantially in recent times (23). GPS provides valuable information regarding the movement patterns of players that help develop an understanding of the physiological demands of the sport and inform training programmes. Contemporary research utilising GPS has tended to feature activity profiles of players during competitive intermittent sports (1, 7, 8, 10-12, 21, 28-30). However, recent research has highlighted inconsistencies within the findings of movement analysis in field hockey and has suggested that deficient protocols may have resulted in an over-estimated training load (30). Furthermore, the paucity of the data available, particularly within the women’s game, represents a substantial gap which needs to be addressed (15).

There is a lack of consistency reported in a number of performance variables that brings into question the use of current methods of analysing GPS data (16). White and MacFarlane (28) demonstrated that the methods used to analyse the data could significantly influence commonly reported movement patterns observed during competition. They found that separating play into ‘time on the pitch’ and ‘full game’ analysis produced different descriptive data in field hockey due to the relatively recent ‘rolling substitution’ rule change, and advocated that the demands on players should be reported relative to the circumstances of the game, thus requiring data to be standardized. Standardized distance derived from the amount of time spent by players on-pitch has not, as yet, been reported in women’s field hockey.

Another potential source or error in GPS data analysis is the use of pre-defined generic activity zones. Generally this tends to include time spent or distance covered in pre-defined speeds that might correspond to walking, jogging, running and sprinting based on an unrelated sport or athletic standard (elite males vs. amateur males). Lidor and Ziv (15) criticized GPS data analysis for not appropriately representing the work rate of players relative to their individual capacity. This is particularly true in the high intensity zones where some players may have slower absolute speeds than others. This is most obviously apparent if comparing males and females where the maximum sprint speeds of females may be lower than that of males due to anthropometric and physiological differences (24). Despite this it is not uncommon for GPS research to use similar high intensity zones for males and females athletes (10, 29). In addition, field hockey research, both male and female, has frequently reported that defenders cover less distance and spend less time in high intensity zones than forwards and midfielders (6, 10, 12, 13, 16, 19-21). However, whether the cause is the defender's relative trained status, tactical instruction or other potential factors is uncertain.

The choice of speed zones has a large impact on the interpretation of the findings and the application of the research. Bangsbo, Nørregaard and Thorsoe (2) analysed the movement patterns of top-level male soccer players using video analysis and compared this to blood lactate concentration collected during a laboratory test and found significant correlation ($r = 0.61$, $p < 0.05$) between the two. Lothian and Farrally (17) defined the movement patterns and energy requirements of hockey from video analysis and heart rate data, which has been used to define exercise intensities in more recent research (21). Rule changes over recent years, such as rolling substitutes, the self-pass and four-quarter sections (the latter is only currently applicable at major international tournaments) have changed the nature of the game and the physiological demands imposed on players. Therefore using pre-defined generic zones based on research almost two decades old (17) may not be appropriate to today's game. Sirotic and Coutts (25) investigated the physiological factors that relate to prolonged high intensity intermittent exercise as seen during field hockey competition. Rather than estimating running activity on pre-defined zones from previous research they utilized maximal sprint speed (MSS) and defined the following six zones; standing: 0% of MSS, walking: 20% of MSS, jogging: 35% of MSS, running: 50% of MSS, fast running: 70% of MSS and sprinting: 100% of MSS. They found strong correlations with lactate threshold ($r = 0.77$, $p < 0.05$), velocity at $\dot{V}O_2max$ ($r = 0.69$, $p < 0.05$), repeat sprint ability ($r = 0.56$, $p < 0.05$) and a weak non-significant relationship with $\dot{V}O_2max$ ($r = 0.17$, $p > 0.05$). They found that this also reflected the typical % HRmax and blood lactate values observed during intermittent competitions. Lactate threshold was significantly correlated with total sprint distance ($r = 0.71$, $p < 0.05$). During field hockey, periods of high-maximal intensity, which correspond to anaerobic exercise, often occur during important moments in a game (e.g. counterattack, goal scoring or goal defending opportunities). Therefore the maximal speed at which this occurs is highly important during a game and it is possible to analyse player movement profiles relative to maximum speed. Furthermore, the majority of GPS-derived field hockey research reports only absolute distances i.e. that accumulated over the course of the entire match regardless of the time the individual player spent on the pitch (e.g. 10-12, 21). Absolute, as opposed to standardized and relative, distances do not account for the nature of the rolling substitutions evident within field hockey and so do not represent the respective work rate of the different playing positions relative to their individual capabilities (30).

Only Macutkiewicz and Sunderland (21) have reported the number of sprints and total associated distance completed by elite women field hockey players using GPS reporting 17 ± 6 and 232 ± 96m respectively. Gabbett (10) reported distance covered in high velocity activities (> $5m\cdot s^{-1}$) and high acceleration activities (>$0.5m\cdot s^{-2}$) by playing position finding 43-58 ± 14-16m and 36-44 ± 10-12m respectively. However, as with the pre-determined generic speed zones discussed above, these cut-offs are not bespoke to the individual and so do not enable us to understand the relative effort of the players in question. Repeated sprint effort (RSE)-based field hockey research has only been conducted for the men's game with Spencer, Lawrence, Rechichi, Bishop, Dawson and Goodman (26) finding throughout the course of an entire match just 17 RSE (defined as a minimum of three sprints with mean recovery of less than 21s between each effort) were apparent across the whole team. Spencer, Rechichi, Lawrence, Dawson, Bishop and Goodman (27) subsequently found that the volume of RSE decreased across a tournament. None of the field hockey research focussing on women has examined RSE and so the profile of female athlete's movement demands in this regard has not yet been reported.

Recent studies in a range of team sports have focussed on the contextual factors which can influence the distance covered by individual players. In addition to those already cited, most commonly such factors and match result (win/draw/loss) (5, 12), or, more recently, the strength of the opposition (30). White and MacFarlane (30) reported that the relationship between distance covered and the quality of the opposition is complex and suggested that consideration of the team's total distance implied that mid-ranked teams strategically reduced their work rate against the best teams. Nevertheless, consideration of the high intensity activity did not support this hypothesis. Some research in other invasion games has attempted to examine the contextual influences of distance covered, although the findings contradict some of those in field hockey. For example Lago, Casais, Dominguez and Sampaio (14) found distance covered to be greater against better quality opposition as well as at home in elite soccer. Consideration of this conflicting evidence suggests that the contextual influence of the quality of the opposition in women's field hockey is unclear.

The purpose of this investigation was to explore the standardized relative distance covered in domestic women's field hockey players across the course of a whole league season and to add clarity to our understanding of the contextual influences of on-field position and the quality of the opposition. Standardised relative distance ($m \cdot min^{-1}$) is defined as metres covered per minute a player was on the pitch and is associated to bespoke movement zones calculated from that individual's maximum sprint speed.

METHODS

Experimental Approach to the Problem

Portable 15Hz GPS units (SPI HPU, GPSports, Fyschwick, Australia) were utilized to collect distance data throughout the course of the 2013-2014 England Hockey Women's Premier League. Data were collected from one team for both home and away matches relating to matches against the other nine teams in the league. All matches comprised two 35 minute halves and were played a minimum of six days apart between the months of September and March. All matches were played outdoors on artificial turf with no overhead obstructions (Mean Temperature = 11.33^{o} C ± 4.52, Mean Humidity = 76.78% ± 13.50). Following the majority of GPS literature in field hockey, players were classified into one of three positional groups (defenders, midfielders, forwards) (13, 21). The nine opposition teams were split into three blocks based on their league finishing position whilst disregarding the team investigated here (top three, middle three and bottom three). This approach enabled the individual relative distance-derived data from the GPS units to be compared across the potential influencing contextual factors of strength of opponent and playing position.

Subjects

The University of Gloucestershire Faculty of Applied Sciences Research Ethics Committee gave approval for the project. Thirteen female hockey players (mean age = 27.98 ± 6.98 years), playing for a team competing in the England Hockey Premier League consented to participate having been briefed on the risks, benefits and right to withdraw from the study. All players were outfielders over the age of 18; no goalkeepers were included in the study. All included players competed in at least 11 of the 18 league games across the season. The players had all completed an extensive pre-season programme; the team were competing in their third successive season in the Premier League. The subjects ranged in experience from former Olympians to novice national league participants. A further five players competed in five or fewer games in the season and were not included in this study.

Procedures

The GPS unit was worn under the playing shirt in a neoprene vest which held the unit between subjects' scapulae. The GPS data were downloaded immediately after the game and were processed using the recommended software (GPSports, Team AMS, version R1 2015.3). Playing time was calculated using the GPS data which was checked against the notes made by the coaching staff during match play. On five occasions a players' data were not recorded by the GPS unit due to an undiagnosed technical fault. In order to ensure independence, only data elicited from athletes' most common playing position was included in the analysis. This resulted in twelve match-analyses being eliminated due to athletes sometimes competing in more than one positional category throughout the course of the season (e.g. sometimes playing as a defender and sometimes as a midfielder). In addition, one participant competed in seven games as a defender and seven as a midfielder and so her data were not included in this study. A total of 204 match-day analyses were collected from the thirteen included players during the course of the season.

Statistical Analyses

Activity zones were customized based on each player's maximum sprint speed (MSS) achieved throughout either the course of the season or during field-based sprint tests (whichever was highest). Following Sirotic and Coutts (25), the cut-offs for the six speed zones utilized in this investigation were: Zone 1 = 0% MSS, Zone 2 = >0% - 20% MSS, Zone 3 = >20% - 35% MSS, Zone 4 = >35% - 50% MSS, Zone 5 = >50% - 70% MSS, Zone 6 = >70% - 100% MSS. The frequency of sprints was calculated as the number of Zone 6 entries. RSE were defined as any

Zone 6 entry with less than 30 seconds recovery since the previous Zone 6 effort was completed (3, 4, 22). Each variable was divided by the number of whole 'on-pitch' minutes the individual participant played in the game to show the standardized relative distance ($m.min^{-1}$) i.e. we were only concerned with the time spent by each player actively involved in the game and not the time spent sitting on the bench as a substitute or when temporarily suspended. The independent variables were playing position and the quality of opposition. Each participant's data were split into the matches competing against top three, middle three or bottom three teams. Mean values were then calculated for each of the dependent variables for the group of matches relating to the three categories of quality of opposition.

All data are presented as mean ± SD by position (i.e. defenders, midfielders and forwards). The dependent variables were tested to ensure no widespread violation of normality or homogeneity of variance. A repeated measures mixed multivariate analyses of variance (MANOVA) was then used to assess differences relating to the independent variables (player position and quality of opposition) for each of the dependent variables (distance covered in the six speed zones, the number and duration of sprints and the number of RSE completed in the highest speed zone). Consideration of Mauchly's Test of Sphericity demonstrated very few violations; relevant corrections were made when required utilizing the Greenhouse-Geisser model (9). Wilks' Lambda (ʌ) was utilized to examine the multivariate interaction effects. Univariate differences between each of the original dependent variables were also calculated as part of the MANOVA process (9). Significant differences indicated between the playing positions and quality of opposition were further investigated via the Tukey *post-hoc* test. The alpha interval for all testing was set at $p < 0.05$. Statistical analyses were performed using SPSS for Windows (IBM SPSS, Version 23.0, Armonk, New York).

RESULTS

TABLE 1 ABOUT HERE

All thirteen players achieved their maximum sprint speed during match play as opposed to during the field-based sprint tests. Table 1 reveals maximum sprint speed ranged from 23.9-29.0km·h^{-1} whilst mean playing time ranged from 33-74 minutes.

FIGURE 1 ABOUT HERE

Figure 1 reveals the standardized relative movement data split by playing position. The interaction between playing position and quality of opposition was not found to be significant ($\wedge$ = 0.07, $F(40, 43.57) = 1.08$, $p = 0.40$). Nevertheless, playing position was shown to be a significant factor ($\wedge$ = 0.00, $F(20, 2) = 35.21$, $p < 0.05$). Univariate tests demonstrated significant differences with respect to overall standardized m·min^{-1} ($F(2) = 4.29$, $p < 0.05$), standardized Zone 2 distances ($F(2) = 8.50$, $p < 0.01$), standardized Zone 3 distances (F(2)) = 10.68, $p < 0.01$) and standardized RSE (F(2)) = 5.81, $p < 0.05$). *Post hoc* tests revealed

Defenders (99.77 ± 4.36m·min^{-1}) covered significantly less overall standardized m.min^{-1} than Midfielders (117.20 ± 4.36 m·min^{-1}) and completed significantly fewer standardized RSE per on-pitch minute (0.21 ± 0.03; 0.33 ± 0.03 respectively – see Table 2). Additionally, *post hoc* tests revealed Midfielders covered significantly less standardized Zone 2 distance than Forwards (19.38 ± 1.64m·min^{-1}; 30.33 ± 2.12m·min^{-1} respectively). Conversely, Midfielders were shown to cover significantly more standardized Zone 3 data than Forwards (32.84 ± 1.10m·min^{-1}; 24.61 ± 1.42m·min^{-1} respectively).

TABLE 2 ABOUT HERE

TABLE 3 ABOUT HERE

Table 3 shows the standardized relative movement data split by playing position and quality of opposition. The main effect of quality of opposition was shown to be significant ($\wedge$ = 0.05, $F(20, 22.00) = 3.63$, $p < 0.05$). Univariate tests showed significant differences by quality of opposition with respect to overall standardized distance m.min^{-1} ($F(1.27) = 6.95$, $p < 0.05$), as well as standardized Zone 3 ($F(2) = 4.46$, $p < 0.05$), Zone 4 ($F(2) = 8.83$, $p < 0.01$) and Zone 5 ($F(2) = 7.27$, $p < 0.01$) distances. *Post hoc* tests revealed participants covered significantly more distance when competing against opponents from top three teams compared to middle three teams with respect to total standardized m·min^{-1} (vs Top Three 111.78 ± 2.65m·min^{-1}; vs Middle Three 107.35 ± 2.62m·min^{-1}), standardized Zone 4 distance (29.47 ± 1.69m·min^{-1}; 27.62 ± 1.45m·min^{-1} respectively) and standardized Zone 5 distance (23.42 ± 1.76m·min^{-1};

21.52 ± 1.79m·min^{-1} respectively). *Post hoc* tests also revealed that players covered significantly more standardized Zone 3 distance against Bottom Three teams (29.26 ± 0.74m·min^{-1}) compared to when competing against Middle Three teams (28.30 ± 0.69m·min^{-1}). No other significant differences were identified.

DISCUSSION

The aim of the study was to explore the standardized relative distance covered in domestic women's field hockey players across the course of a whole league season and to add clarity to our understanding of the contextual influences of on-field position and the quality of the opposition. Standardized relative distances of the players were based on the number of on pitch minutes and the players' maximum sprint speed during the season respectively. Standardized relative distance data were then available for six different speed zones in metres per minute (m·min^{-1}), number of sprints, sprint duration and RSE. The use of standardized relative distance is bespoke to the individual player and offers a useful insight into the movement patterns of the defenders, midfielders and forwards. In addition, the data suggest that both quality of the opposition and playing position do impact the standardized relative distance covered by the players, although there is no interaction effect. These findings will be discussed in detail below.

Almost all previous GPS-derived studies of women's field hockey have reported that midfielders cover significantly higher distances than either defenders or forwards (6, 10, 21). Our findings partially support this previous research insofar as midfielders were shown to cover greater overall standardized relative distance than defenders. However, our findings suggesting that midfielders and forwards did not demonstrate significantly different total standardized relative distance contrasts with previous studies (10, 21). This may be due to the failure of previous research to calculate distance with respect to the number of minutes each player spent on the pitch (e.g. 6, 10, 21) thus potentially over-reporting the distance covered by midfielders in comparison to forwards. Research which has calculated distance relative to pitch time (e.g. 12, 13, 16, 19) has also reported significantly greater distance for midfielders than both defenders and forwards; however, these studies did not account for the relative maximum sprint speed of the players and so are still operating under generic, rather than individual and bespoke, calculations of individual distance covered within, for example, six speed zones. Furthermore, application to the context of this study is further hindered by the fact that all four of these studies were conducted with male athletes. To our knowledge this is the first paper to report the standardized relative distance in women's field hockey.

Our findings do support all previous field hockey research regarding the greater intensity and speed of distance covered by midfielders than defenders (6, 10, 12, 13, 16, 19, 21) although the significant differences we found between the intensity of distance covered by forwards compared to the other two groups was again less pronounced than these previous investigations. Our results suggest that forwards demonstrated greater standardized relative distance in the lower speed zones than midfielders when taking playing time into consideration, particularly in Zone 2 which is, perhaps, akin to walking. The results suggesting that midfielders covered significantly greater standardized relative distance than forwards in

Zone 3 (akin to a slow jog) follows a similar pattern to previous GPS-based research in field hockey (e.g. 6, 10, 12, 13, 16, 19, 21) although the calculation of zone-based distances relative to maximum sprint speed appears to have reduced the magnitude of the differences evident in the other studies and revealed fewer differences in the faster speed zones. Overall, our findings suggest midfielders are required to cover a little more ground relative to their own physiological capabilities per on-pitch minute than forwards or defenders. However, the small number of significant differences by position in the zone-based analysis also suggests that the differences between the standardized relative distances of outfield players in field hockey when calculated relative to individual maximum sprint speed is less pronounced that has previously been suggested (6, 15, 18-20).

The sprint-related data reported in this study inform the emerging patterns evident within the recent research literature. The majority of men's field hockey research has demonstrated that forwards perform the most sprint-related activity (12, 19, 26) when compared to the other positions. RSE is an important component of field hockey (26) and to our knowledge previous research is only available on male field hockey players (26, 27); the current study is the first to highlight the RSE in the women's game. RSE were defined as any entry in Zone 6 (70-100% MSS) with less than 30 seconds recovery since the previous zone 6 effort was completed (2, 3, 24). The data suggest that midfielders engage in more RSE than defenders (Table 1). Using a more conservative definition for RSE (21 seconds recovery between a minimum of three sprints), Spencer et al. (26) reported a mean number of 17 RSE in elite men's hockey which is larger than that reported in the present study. This is likely due to different definitions of a RSE, our use of standardized relative distance and the difference in playing standard (international vs national) between the two studies but further research on RSE comparing women's and men's hockey may be of interest.

White and MacFarlane (30) conducted the only study to examine the impact of the strength of the opposition on work rate in women's female hockey finding a strong effect in some relative distance variables, in particular suggesting that players worked harder against more highly-ranked opponents (although not the very best teams). The findings of the present study partially support White and MacFarlane's (30) research as our participants did work harder against better opponents, although this did extend to the very best three teams in the league. This may be due to the numerous methodological differences between the two studies; for example, White and MacFarlane (30) examined only one competitive match per individual player and analysed team average distances. Furthermore, the team investigated in the present study struggled during the course of the season losing 15 out of the 18 league matches and finished ninth out of 10 in the league. Therefore most opposition teams within this investigation were considerably stronger than the team we investigated and this was further evidenced by a small number of one-sided score lines when competing against the top three teams, but not three middle three teams. This is interesting and future research is required to understand the complexity of league position, match results and strength of the opposition. No studies to date have investigated the impact of tactical strategies which may be employed against particular teams which may, for example, limit the movement of certain players for strategic advantage (such as a defensive midfielder) or seek to mirror the movement of a particular opponent (e.g. man marking a strong player). Future research should examine a broader range of variables which may help to explain the contextual influences on work rate in domestic women's field hockey.

PRACTICAL APPLICATIONS

The present paper suggests performance analysts, researchers, coaches and sport scientists should carefully consider the methods used to analyse relative distance in field sports. We propose that distance and movement patterns should be expressed relative to each individual players' time on the pitch and also to their maximum sprint speed. This will ensure that coaches have an individualized appreciation of their players' physiological capabilities and utilize this information in assessing the standardized relative distance covered by the players in match situations. Coaches should understand that the total relative distance may be different for each of the major playing positions but that the amount of time on the pitch should be taken into consideration when preparing appropriate training programmes. Using standardized relative distance to analyse performance allows for comparison both within and between players, and also between teams, sex and age (to name a few). The frequent rule changes that occur in field hockey alter the nature of the game so a more flexible approach to our analysis is warranted to monitor the physiological demands of the sport. Finally, the differences between playing positions may not be directly comparable between men's and women's hockey and so training programmes and relative distance analysis should take account of the contrasting demands.

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Table 1: Player positions, games played and MSS

Player	Position	Games played[a]	MSS ($km \cdot h^{-1}$)	Mean pitch time (minutes)
1	Defender	17 (5, 6, 6)	24.6	67.94
2	Defender	18 (6, 6, 6)	26.0	62.00
3	Defender	16 (5, 6, 6)	25.6	71.56
4	Defender	16 (6, 5, 5)	23.8	73.81
5	Midfielder	11 (3, 4, 4)	23.9	48.82
6	Midfielder	15 (6, 5, 4)	24.9	44.27
7	Midfielder	18 (6, 6, 6)	27.4	61.22
8	Midfielder	15 (5, 6, 4)	25.6	53.20
9	Midfielder	18 (6, 6, 6)	24.6	32.89
10	Midfielder	17 (6, 5, 6)	25.3	70.00
11	Forward	13 (4, 4, 5)	26.6	54.00
12	Forward	12 (4, 5, 3)	26.4	68.42
13	Forward	18 (6, 6, 6)	29.0	49.94

[a] Numbers in parentheses represent the number of games played against top three, middle three and bottom three teams respectively.

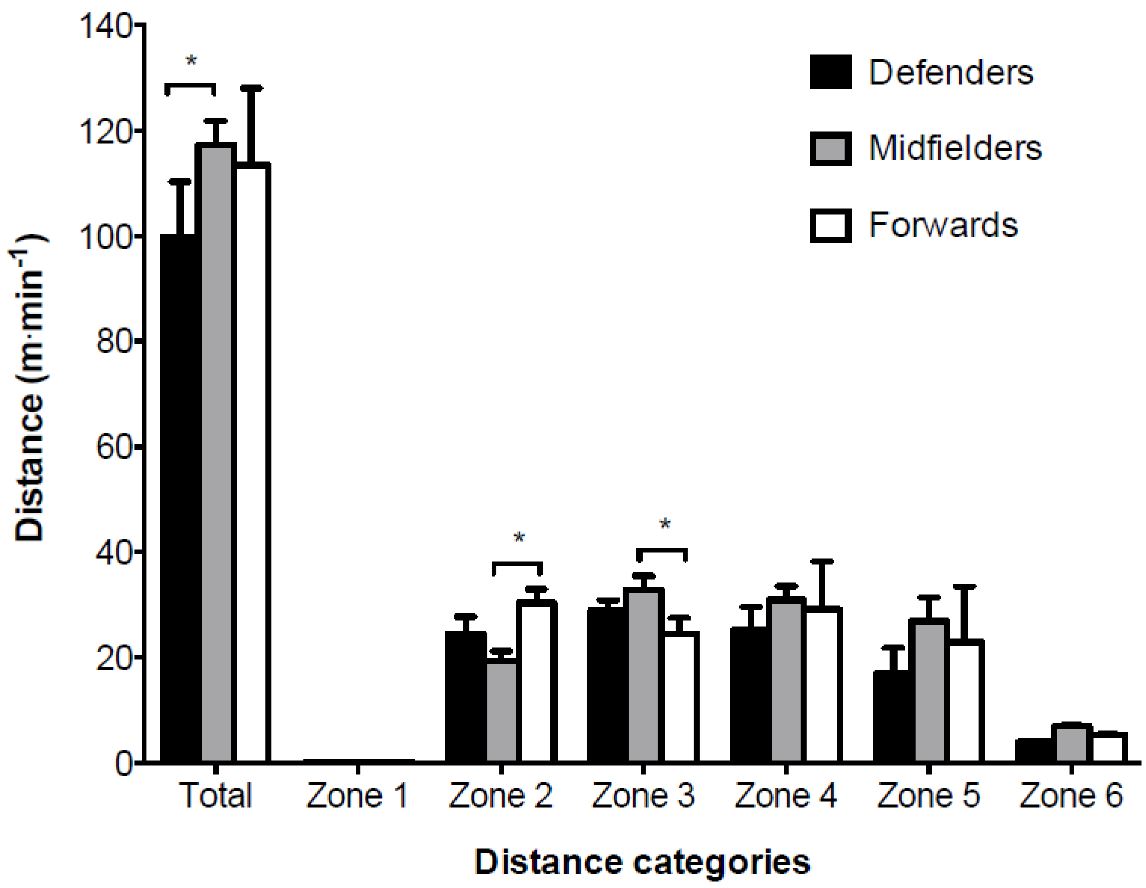

Figure 1: Distances covered by defenders, midfielders and forwards

Table 2: Number of sprints, time spent sprinting and number of RSE for defenders, midfielders and forwards

	Defenders	Midfielders	Forwards
Sprints	0.25 ± 0.07	0.43 ± 0.07	0.30 ± 0.10
Sprint Time (s)	0.66 ± 0.22	1.18 ± 0.22	0.71 ± 0.29
RSE [a]	0.21 ± 0.03	0.32 ± 0.03	0.22 ± 0.03

[a] Significant difference between defenders/midfielders as demonstrated by Tukey *post-hoc* comparisons ($p<0.05$).

N.B. All data are means (± SD) and standardized per on-pitch minute.

Table 3: Distance and sprint data by quality of opposition for defenders, midfielders and forwards

	Defenders			Midfielders			Forwards		
	vs Top	vs Middle	vs Bottom	vs Top	vs Middle	vs Bottom	vs Top	vs Middle	vs Bottom
Total ($m.min^{-1}$)[a]	101.00 ± 4.15	96.57± 4.11	101.75 ± 5.19	118.58 ± 4.26	115.78 ± 4.77	117.22 ± 5.14	115.75 ± 5.50	109.71 ± 6.15	114.60 ± 6.63
Zone 1 ($m.min^{-1}$)	0.16 ± 0.02	0.16 ± 0.02	0.16 ± 0.02	0.17 ± 0.02	0.17 ± 0.02	0.17 ± 0.02	0.15 ± 0.02	0.18 ± 0.02	0.18 ± 0.02
Zone 2 ($m.min^{-1}$)	24.60 ± 1.86	24.58 ± 1.65	24.51 ± 1.51	19.31 ± 1.81	19.16 ± 1.58	19.67 ± 1.47	30.52 ± 2.34	31.07 ± 2.04	29.40 ± 1.90
Zone 3 ($m.min^{-1}$)[b]	29.23 ± 1.17	28.42 ± 1.08	29.25 ± 1.17	32.46 ± 1.15	32.93 ± 1.18	33.14 ± 1.14	24.90 ± 1.48	23.54 ± 1.53	25.40 ± 1.47
Zone 4 ($m.min^{-1}$)[a]	26.11 ± 2.64	24.37 ± 2.27	25.25 ± 2.14	31.98 ± 2.54	30.70 ± 2.39	30.12 ± 2.15	30.33 ± 3.28	27.79 ± 3.08	29.56 ± 2.77
Zone 5 ($m.min^{-1}$)[a]	17.28 ± 2.76	15.68 ± 2.81	17.86 ± 3.05	27.95 ± 2.73	26.21 ± 2.75	26.75 ± 2.99	25.03 ± 3.52	22.67 ± 3.55	20.99 ± 3.86
Zone 6 ($m.min^{-1}$)	3.68 ± 1.24	3.65 ± 1.16	4.76 ± 1.51	6.82 ± 1.41	6.52 ± 1.23	7.48 ± 1.53	5.12 ± 1.82	4.67 ± 1.59	4.24 ± 1.98
Sprints	0.24 ± 0.08	0.22 ± 0.06	0.28 ± 0.08	0.43 ± 0.09	0.43 ± 0.09	0.46 ± 0.08	0.34 ± 0.12	0.30 ± 0.08	0.26 ± 0.11
Sprint Time (s)	0.61 ± 0.22	0.59 ± 0.20	0.79 ± 0.26	1.15 ± 0.25	1.10 ± 0.21	1.29 ± 0.26	0.78 ± 0.32	0.70 ± 0.27	0.66 ± 0.34
RSE	0.20 ± 0.03	0.22 ± 0.04	0.22 ± 0.04	0.32 ± 0.03	0.33 ± 0.04	0.33 ± 0.04	0.22 ± 0.04	0.22 ± 0.05	0.22 ± 0.05

[a] significant overall difference in distance covered against top and middle opponents
[b] significant overall difference in distance covered against bottom and middle opponents
N.B. All data are standardized per on-pitch minute