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Match Movement Profiles Differences in Spanish Soccer Competitive Leagues According to Opposition's Team Ranking: A Comparison Study

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Abstract: (1) Background: This study analyzed the differences in match movement profiles according to opponent quality (i.e., match balance) in the professional Spanish soccer leagues over four consecutive seasons (from 2015/2016 to 2018/2019); (2) Methods: The ChyronHego® system was used to record competition movement data from all matches played in the First (Liga Santander; n = 1520) and Second Spanish Division (Liga Smartbank; n = 1848). The total distance (TD) and high-intensity running distance (TD > 21 km·h^{-1}) covered with and without ball possession (TDWP and TDWOP, respectively) were analyzed using a Linear Mixed Model, considering the opponent quality contextual variable; (3) Results: Results showed that teams covered a significantly greater TD when played against the lowest quality teams in L1 ($p < 0.05$), while in L2 teams covered a significantly greater TD when played against the highest quality teams ($p < 0.05$). Teams covered a significantly greater TDWP and TDWP > 21 km·h^{-1} when playing against the highest quality teams in both L1 and L2 ($p < 0.05$). On the contrary, playing against the lowest quality teams in L1 versus the highest quality teams in L2 implied more TDWOP and TDWOP > 21 km·h^{-1} ($p < 0.05$); (4) Conclusions: The present study indicates that match movement profiles depend on contextually related variables.

Keywords: match physical demands; match analysis; performance analysis; professional soccer; Spanish leagues; ranking

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1. Introduction

The final ranking in soccer leagues is based on the points per soccer match accumulated throughout the competitive season [1]. Hence, the team that scores the most points at the end of the tournament is the winner. To our knowledge, to achieve success in the final ranking, teams must overcome different types of matches influenced by contextual-related variables, such as opponent quality (i.e., strong or weak [2]). Research has reported that the opponent's quality significantly influences team performance and match physical demands during soccer competitions [3–5]. Furthermore, match balance (i.e., the difference in the final ranking between two opponent teams) could be a factor in understanding the interaction between teams' performance and match physical demands [6,7].

To date, team sports organizations (i.e., soccer, American football, basketball, or rugby) have invested in video-tracking systems with the aim of quantifying training and competition characteristics [8]. Concretely, in soccer, the use of video-tracking system

technology has become an essential tool for practitioners and performance analysts to collect and interpret data about teams' time–motion analysis during soccer competitions [9]. Moreover, these tools improve the training process and help to better understand the gap between theory and practice during matches and training sessions [10–12]. Specifically, the use of key performance indicators is deeply implanted in professional soccer [13,14]. These indicators can compare and predict future teams' behaviors or players' movement patterns according to contextually related variables [15,16]. Furthermore, they enable the approach applied to analyze the match physical demands and team success (i.e., they may discriminate between games where a soccer team won, drew, and lost [17]).

In this vein, it has been suggested that team performance analysis needs to interpret soccer teams' results as dynamic and unpredictable since the physical performance of soccer players swings across the season [18]. In addition, the external load must consider contextual-related variables [19]. For instance, research about opponent quality has revealed that when the opponent's quality is better, more distance can be covered at a low intensity [20]. Meanwhile, several studies have analyzed some professional soccer leagues and they have reported that the amount of high-intensity running distance (HIRD) covered during games was greater against the highest quality teams than the lowest quality teams [4,21–23]. Recently, Nobari et al. [24] discovered that the level of the opponent affects the external load that soccer players experience during matches in the Asian league. They noted that in games against top-level teams, decelerations in all zones were the greatest. Another study evaluated the match running performance of soccer players in the Brazilian National Second League considering the quality of opposition teams (e.g., bottom- and top-ranked). It found that the top-ranked teams' matches against bottom opponents required significant amounts of high acceleration and sprinting actions [25]. On the contrary, Paraskevas et al. [26] have shown that playing versus a weak opponent was related to a higher total distance (TD) and HIRD covered during home matches.

Regarding differences between standard leagues on match movement profiles, research has shown no relationship between better physical performance and greater success in soccer competitions between teams from different countries or leagues [27], between teams from the same country but other divisions [28], or between teams belonging to the same division [29]. Furthermore, there is no relationship between physical variables such as the TD covered by teams in the top two Spanish soccer leagues and the points earned over the competitive season [30].

Currently, physical demands variation regarding opponent quality considering match context has been accurately assessed in soccer matches [5,26]. However, more research about the relationship between match physical demands and opponent quality is necessary to identify how the performance fluctuations affect physical performance in a homogenous group but with different rankings which competes within the same soccer league or between different soccer leagues. Therefore, this study aimed to examine the differences in movement profiles according to opponent quality (i.e., match balance) between the First (LaLiga^{TM} Santander) and Second (LaLiga^{TM} Smartbank) Division of Spanish professional soccer leagues over four consecutive seasons (from 2015/2016 to 2018/2019). Based on previous studies, we have had two hypotheses: (i) Match running performance can differ between teams based on opponent quality. Concretely, the TD would be greater when the quality of the opponent was better [20]; similarly, the TD > 21 km·h^{-1} would be higher against high-quality teams [4,21]. Additionally, (ii) match movement profiles, considering the opponent quality contextual variable, can influence distances covered with and without ball possession.

2. Materials and Methods

The sample included all games played by soccer teams that participated in the First (L1) and Second (L2) Spanish soccer leagues over four consecutive seasons (2015/2016, 2016/2017, 2017/2018, and 2018/2019). Goalkeepers and players who played for less than 15 min during the matches were excluded because the average values obtained from

these players were greater than the team average [31]. Thus, 5916 out of 6736 potential records were included in the study, belonging to 3368 matches played by L1 (Liga Santander; n = 1520) and by L2 (Liga Smartbank; n = 1848). Due to technical issues with the data recording system or unfavorable weather conditions during the match, 820 (12.17%) observations were discarded. The study was approved by the University of Extremadura (code number: 153/2017), and data were provided to the authors by LaLiga™.

2.1. Procedure and Variables

An optical tracking system collected match physical demands data (ChyronHego®; TRACAB, New York, NY, USA). Eight super 4K High Dynamic Range cameras are used in this multicamera tracking system to follow and track the soccer players on the pitch. The cameras capture video from various angles and offer real-time tracking with 25 Hz data. According to an analysis of the video-tracking system's validity and reliability, the TD covered showed average measurement errors of 2% [32]. Additionally, a few studies have examined the agreement between GPS devices and the Mediacoach® system [33]. Specifically, the intraclass correlation coefficient (ICC) magnitude was <0.90.

The match physical demands variables analyzed were categorized according to the ball possession as follows [34,35]: with possession (WP) and without possession (WOP). Two variables were studied for each of these categories: total distance (m) covered by players (i.e., TD) and total distance covered at more than 21 km·h^{-1} (i.e., TD > 21 km·h^{-1}).

To examine if opponent quality influenced match running performance, the difference in the final ranking of the analyzed team and the opponent was included in the analysis (i.e., match balance = TA–TB), where TA is the final ranking of the analyzed team, and TB is the final ranking of the opponent team [21]. For example, if team A ranked 6th and team B ranked 14th, the opponent quality would be −8; likewise, in that same match considering the opponent team, opponent quality would be +8.

The value range was set between −19 and +19 in L1 and −21 and +21 in L2. So, the less the value, the easier the match was for the analyzed team; likewise, the greater the value, the harder the match was.

Finally, due to the match variability, opponent quality was divided into five different groups according to match balance values: match balance 1 (MB1; matches where the match balance value was +10); match balance 2 (MB2; matches where the match balance value was between +4 and +9); match balance 3 (MB3; matches where the match balance was between +3 and −3); match balance 4 (MB4; matches where the match balance value was between −4 and −9); match balance 5 (MB5; matches where the match balance value was −10).

2.2. Statistical Analysis

All statistical analyses were conducted using R-studio [36]. Considering the characteristics of the sample, organized hierarchically, nested in groups, and with a longitudinal structure, we considered that the best procedure to analyze the data was through Linear Mixed Models (LMMs). A LMM was applied to analyze the differences in match running performance variables concerning opponent quality using the lme4 package [37].

Firstly, a two-level hierarchy was modeled for the analysis. The match running performance variables (i.e., TD and TD > 21 km·h^{-1}) were included as dependent variables in the models, and opponent quality and the leagues (L1 and L2) were the independent variables included as fixed effects. The variable team was considered as the random effect in the analysis. For each model, a general multilevel modeling strategy was performed [38]. This procedure involves including fixed and random effects in steps, progressing from the simplest to the most complex model. The model comparison was made using the Akaike information criterion (AIC; [39]) and Chi-square likelihood ratio tests [40]. A lower value of the AIC and the Chi-square loglikelihood test indicated whether the model was better than the previous one and if the changes were significant. The maximum likelihood

(ML) estimation was employed to compare the models. Finally, we reported marginal and conditional R2 metrics [41] for each LMM to provide some measure of effect sizes.

3. Results

Tables 1 and 2 show the intercepts and standard errors of match movement profiles (i.e., TD and TD > 21 km·h^{-1}) with and without ball possession, considering the leagues and the five levels of opponent quality.

Table 1. Movement profiles based on quality of the opponent in LaLiga Santander.

	L1					Between-Groups Differences				
	MB1	**MB2**	**MB3**	**MB4**	**MB5**	**MB1**	**MB2**	**MB3**	**MB4**	**MB5**
TD (m)	108,807	109,020	108,858	109,348	109,534	d,e	e	d,e	a,b	a,b
TDWP (m)	41,580	40,163	39,061	38,486	37,057	b,c,d,e	a,c,d,e	a,b,e	a,b,e	a,b,c,d
TDWOP (m)	38,759	40,755	42,271	44,418	47,681	b,c,d,e	a,c,d,e	a,b,d,e	a,b,c,e	a,b,c,d
TD < 21 km·h^{-1} (m)	5918	5956	5861	5956	5914		c	b,d	c	
TDWP < 21 km·h^{-1} (m)	2882	2790	2625	2578	2433	b,c,d,e	a,c,d,e	a,b,e	a,b,e	a,b,c,d
TDWOP < 21 km·h^{-1} (m)	2901	3035	3105	3252	3360	b,c,d,e	a,c,d,e	a,b,d,e	a,b,c,e	a,b,c,d

Note. L1 = LaLiga Santander; MB1 = Match balance 1; MB2 = Match balance 2; MB3 = Match balance 3; MB4 = Match balance 4; MB5 = Match balance 5; TD = total distance; TDWP = total distance with ball possession; TDWOP = total distance without ball possession; a = significant differences compared to Group 1; b = significant differences compared to Group 2; c = significant differences compared to Group 3; d = significant differences compared to Group 4; d = significant differences compared to Group 5.

Table 2. Movement profiles based on quality of the opponent in LaLiga Smartbank.

	L2					Between-Groups Differences				
	MB1	**MB2**	**MB3**	**MB4**	**MB5**	**MB1**	**MB2**	**MB3**	**MB4**	**MB5**
TD (m)	108,538	107,673	107,606	107,606	107,995	b,c,d	a	a	a	
TDWP (m)	37,692	37,248	37,340	37,146	37,457					
TDWOP (m)	40,990	40,235	40,381	40,255	40,436	b	a			
TD < 21 km·h^{-1} (m)	5622	5505	5529	5436	5490	b,c,d,e	a	a,d	a,c	a
TDWP < 21 km·h^{-1} (m)	2605	2505	2470	2394	2370	b,c,d,e	a,d,e	a,d,e	a,b,c	a,b,c
TDWOP < 21 km·h^{-1} (m)	2869	2852	2902	2900	2979	e	e	e	e	a,b,c,d

Note. L1 = LaLiga Santander; MB1 = Match balance 1; MB2 = Match balance 2; MB3 = Match balance 3; MB4 = Match balance 4; MB5 = Match balance 5; TD = total distance; TDWP = total distance with ball possession; TDWOP = total distance without ball possession; a = significant differences compared to Group 1; b = significant differences compared to Group 2; c = significant differences compared to Group 3; d = significant differences compared to Group 4; d = significant differences compared to Group 5.

Regarding the TD, greater values were obtained during MB5 in L1 (109,534 m), showing significant differences with respect to MB1 and MB2 ($p < 0.05$). Conversely, the TD was greater during MB1 in L2 (108,538 m), showing significant differences to MB2, MB3, and MB4 ($p < 0.05$). Concerning the TD with and without ball possession, the TDWP was greater during MB1 in L1 (41,580 m), showing significant differences with respect to MB2, MB3, MB4, and MB5 ($p < 0.05$). Similarly, the TDWP was greater during MB1 in L2 (37,692 m). In contrast, the TDWOP was greater during MB5 in L1 (47,681 m), showing significant differences with respect to MB1, MB2, MB3, and MB4 ($p < 0.05$). Meanwhile, in L2, the TDWOP was greater during MB1 (40,990 m), showing significant differences with respect to MB2.

Regarding the TD > 21 km·h^{-1}, greater values were obtained during MB2 and MB4 in L1 (5956 m), showing significant differences with respect to MB3 ($p < 0.05$). Conversely, the TD > 21 km·h^{-1} was higher during MB1 in L2 (5622 m), showing significant differences with respect to MB2, MB3, MB4, and MB5 ($p < 0.05$). Concerning the TD > 21 km·h^{-1} with and without ball possession, the TDWP > 21 km·h^{-1} was greater during MB1 in L1 (2882 m), showing significant differences with respect to MB2, MB3, MB4, and MB5

($p < 0.05$). Similarly, the TDWP > 21 km·h^{-1} was greater during MB1 in L2 (2605 m), showing significant differences with respect to MB2, MB3, MB4, and MB5 ($p < 0.05$). In contrast, the TDWOP > 21 km·h^{-1} was greater during MB5 in L1 (3360 m), showing significant differences with respect to MB1, MB2, MB3, and MB4 ($p < 0.05$). In L2, the TDWOP > 21 km·h^{-1} was greater during MB5 (2979 m), showing significant differences with respect to MB1, MB2, MB3, and MB4 ($p < 0.05$).

Differences between leagues (L1 vs. L2) on match running performance are presented in Figures 1 and 2. Firstly, the TD was significantly greater in L1 with respect to L2 in MB2 ($p < 0.001$), MB3 ($p < 0.01$), M4 ($p < 0.001$), and MB5 ($p < 0.001$). Concerning the TD with and without ball possession, the TDWP was significantly greater in L1 with respect to L2 in MB1 ($p < 0.001$), MB2 ($p < 0.001$), MB3 ($p < 0.001$), and MB4 ($p < 0.01$). Conversely, the TDWOP was significantly greater in L2 with respect to L1 in MB1 ($p < 0.001$), while significantly greater values were obtained in L1 with respect to L2 in MB3 ($p < 0.001$), MB4 ($p < 0.001$), and MB5 ($p < 0.001$).

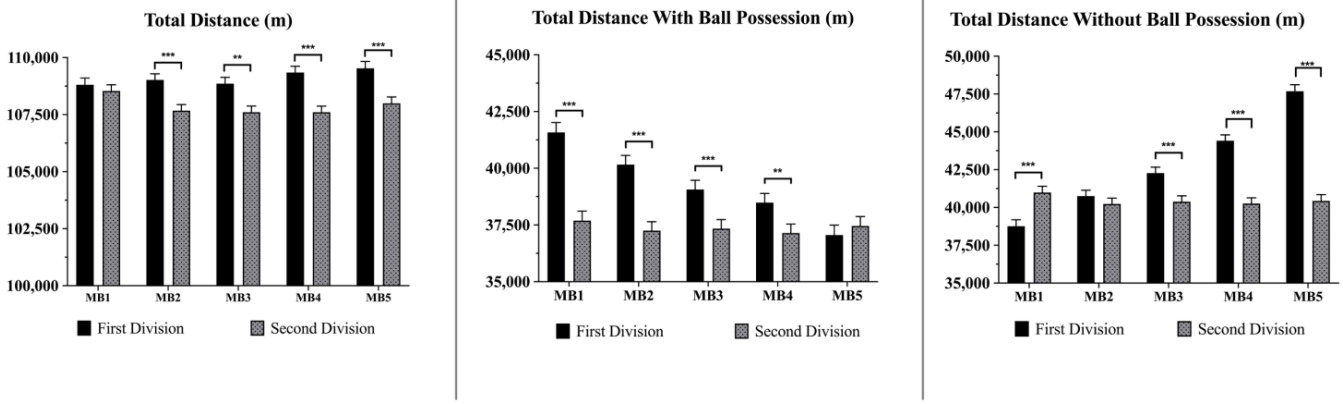

Figure 1. The total distance (in meters) with and without ball possession. ** $p < 0.01$. *** $p < 0.001$.

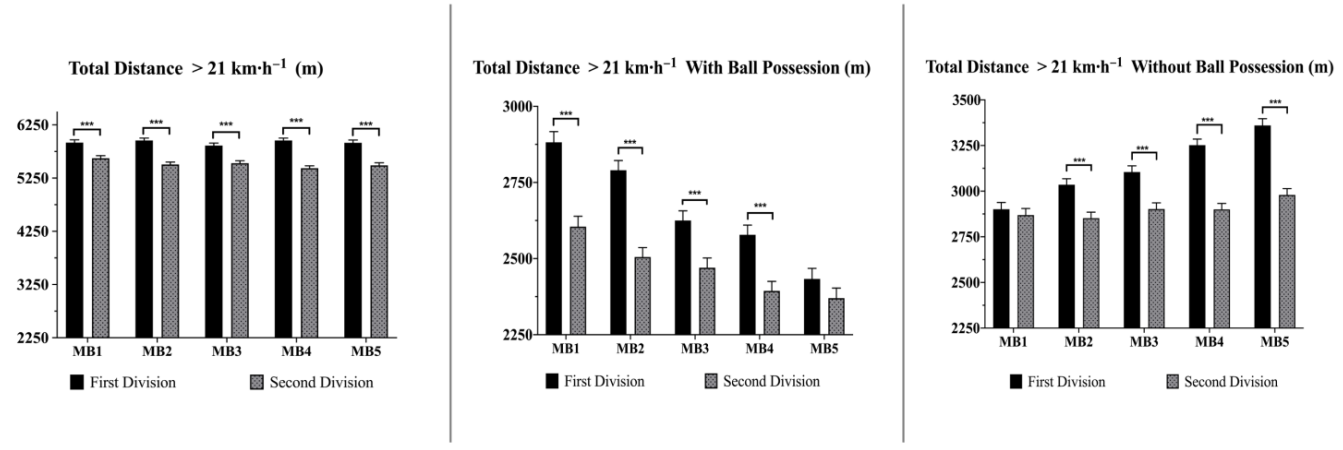

Figure 2. The total distance covered at < 21 km·h^{-1} (in meters) with and without ball possession. ** $p < 0.01$. *** $p < 0.001$.

Secondly, the TD > 21 km·h^{-1} was significantly higher in L1 with respect to L2 in MB1 ($p < 0.001$), MB2 ($p < 0.001$), MB3 ($p < 0.001$), MB4 ($p < 0.001$), and MB5 ($p < 0.001$). Concerning the TD > 21 km·h^{-1} with and without ball possession, the TDWP > 21 km·h^{-1} was significantly higher in L1 with respect to L2 in MB1 ($p < 0.001$), MB2 ($p < 0.001$), MB3 ($p < 0.001$), and MB4 ($p < 0.001$). Similarly, the TDWOP > 21 km·h^{-1} was significantly

higher in L1 with respect to L2 in MB2 ($p < 0.001$), MB3 ($p < 0.001$), MB4 ($p < 0.001$), and MB5 ($p < 0.001$).

4. Discussion

The present study aimed to examine the differences in match movement profiles according to the opposition's team ranking (i.e., match balance) in the professional Spanish soccer leagues over four consecutive seasons (from 2015/2016 to 2018/2019). The novel findings of the current study were that teams covered significantly greater TD when played against the lowest quality teams (MB5) in L1, while in L2 teams covered a significantly greater TD when played against the highest quality teams (MB1). Concerning match movement profiles with and without ball possession, teams covered a greater TDWP and TDWP > 21 km·h^{-1} when playing against the highest quality teams (MB1) in both L1 and L2. On the contrary, playing against the lowest quality teams (MB5) in L1 versus the highest quality teams (MB1) in L2 implied more TDWOP and TDWOP > 21 km·h^{-1}.

Firstly, concerning the TD covered by soccer teams, we hypothesized that the TD would be greater when the quality of the opponent was better (Hypothesis 1). The most striking result from the data is that the TD was significantly greater when teams played against the lowest quality teams (MB5) in L1. Similar results have been found by Paraskevas et al. [26], where competing versus a "weak" opponent was related with more TD and TD > 21 km·h^{-1} covered during home games compared with away games. A possible explanation for this might be that top-ranked teams could be winning these unbalanced matches against the lowest quality teams, and during the matches they would use greater defensive activities because they preferred to decrease ball possession [3]. Another possible cause of this may be due to the need of these teams to win the matches to rise in the final ranking or to accomplish the goals at the end-season. Therefore, they try to reach their maximum physical performance to win soccer matches [4]. Even the higher TD covered by top-ranked teams could be explained because their players had better physical fitness levels, allowing them to reach greater physical performance. Meanwhile, teams from L2 covered a significantly greater TD when playing against the highest quality teams (MB1). Similar results were also obtained for TD > 21 km·h^{-1} during MB1. Therefore, Hypothesis 1 was only confirmed in L2 matches. These results may be explained by the fact that bottom-ranking teams have generally covered more TD during the season, as previous studies have reported [29,34,35], or may even be due to weak soccer teams needing to put in more effort during the season to win their matches [21]. Another reason could be that these soccer teams lost their matches several times and they needed to reach their maximum physical capacity to draw or win the match [4].

Concerning the TD with and without ball possession, we hypothesized that a quality opponent would significantly influence match movement profiles (Hypothesis 2). The results reported that the TDWP and TDWP > 21 km·h^{-1} were significantly greater when teams played against the highest quality teams (MB1), both in L1 and L2. A possible explanation for this might be that playing against top-ranked teams could imply adverse results and, consequently, losing teams usually increase their percentage of possession to "control" the game by dictating play, while weakness in the opposition defense is sought [3]. In this line, Ponce-Bordón et al. [42] reported that the TDWP increased for each minute that teams were losing in the First Spanish Division. Meanwhile, the TDWOP and TDWOP > 21 km·h^{-1} were significantly higher when teams played against the lowest quality teams (MB5) in L1. On the other hand, playing against bottom-ranked teams could imply positive results, and when teams were ahead or drawing they chose to play counter-attacking or direct play, often using long passes, so ball possession decreased [3]. It can be suggested that the TDWOP was increased when teams were winning [18]. On the contrary, the TDWOP and TDWOP > 21 km·h^{-1} were significantly higher when teams played against the highest quality teams (MB1) in L2. Bottom-ranked teams have generally covered more TDWOP, as previous studies have reported [21,34]. This finding likely represents a higher match time performing defensive activities by the bottom-ranked teams, potentially during

imbalanced matches, where top-ranked teams control the ball and impose their playing style [35].

Finally, regarding the match movement profile comparisons between standard leagues (L1 vs. L2), the results reported that the TD and TD > 21 km·h^{-1} were significantly greater in L1 than L2. Our findings agree with recent research, which reported that top-tiered leagues had greater physical demands during matches [28,43,44]. Concretely, Pons and Ponce-Bordón et al. [45] have reported that distances covered at high intensity and the number of high-intensity efforts were significantly greater in L1 with respect to L2. In addition, variables related to ball possession, such as the TDWP or TDWOP, were also significantly greater in L1 than L2. Taken together, these results suggest that the physical and technical performance of the soccer players of L1 could be greater than L2 due to the fact that L1 clubs significantly contribute to developing their players' match performance [46].

4.1. Study Limitations and Future Prospects

This study increases the knowledge about this research topic; however, a few limitations could be identified with a view to further research. Firstly, only the TD and TD > 21 km·h^{-1} were considered, so deeper analysis based on more physical variables should be interesting to increase knowledge about the influence of opponent quality on physical performance. Secondly, more research is required considering a few factors, such as the playing style or match status, since the physical performance could depend on different contextual-related variables. Finally, only data from the Spanish soccer matches were involved in this study, so this could limit the application of these findings to other leagues. For that reason, future studies could replicate the protocol reported in this study to find differences in the match movement profiles between different opponent quality in other European leagues.

4.2. Practical Applications

These findings have implications for understanding how physical performance varies in Spanish professional soccer. Concretely, the present study increases previous research demonstrating that the difference in the final ranking of the analyzed team and the opponent influences both match physical demands and ball possession. These results provide very useful information to strength and conditioning coaches to manage the external load during weekly training sessions according to both the next and previous matches, because they can adapt the training load according to the external load of soccer matches. For example, they can also provide different recovery strategies after MB1 or MB5 matches, or technical staff could even plan harder or softer training sessions regarding the TD or HIRD covered considering the opponent quality of the next soccer match.

5. Conclusions

This research examined the influence of opponent quality on match movement profiles, also taking into consideration the distances covered with and without ball possession. The most interesting findings were that teams covered a significantly greater TD when played against the lowest quality teams (MB5) in L1, while in L2 teams covered a significantly greater TD when played against the highest quality teams (MB1). The evidence from this study suggests that bottom-ranked teams need to put in more effort during the season to win their matches. Furthermore, it seems that bottom-ranked teams covered more TDWOP during imbalanced matches, where these teams perform more defensive activities and top-ranked teams control the ball and impose their playing style. Finally, the present study adds to the growing body of research that indicates that match movement profiles depend on contextual-related variables.

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Data Availability Statement: Restrictions apply to the availability of these data. Data were obtained from LaLiga and are available with the permission of the corresponding author.

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