https://doi.org/10.7251/SSH24V128A
UDC: 793.7-053.2:615.851
Paper review
Pregledni rad

Sprint characteristics and distance covered of female soccer players during the game

Eggy Nur Arfiansyah, Ahmad Nasrulloh
Department of Sports Science, Faculty of Sports and Health Sciences, Yogyakarta State University, Indonesia

Correspondence:
Eggy Nur Arfiansyah, Department of Sports Science, Faculty of Sports and Health Sciences, Yogyakarta State University, Indonesia, eggynur.2022@student.uny.ac.id

Abstract: *The purpose of writing this review is to increase our understanding of the physical demands of women's soccer matches, especially the differences in sprint ratio and cruising power during matches with higher standards of play and between playing positions. The systematic review was conducted by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement. An electronic systematic search of databases (Elsevier, PubMed, and Sage Journals) was completed on February 21, 2024, with no date restrictions applied. Electronic database searches identified 292 articles. A total of 16 articles remained for analysis after removal of duplicates, and initial and full-text screening. Then the number of articles was screened through several stages concerning the planned inclusion criteria and 8 articles met the inclusion criteria. The results of the current study show based on playing standards, the population is divided into semi-professionals, professionals, domestic and international players, national teams, and student or college classes. The locations of the studies varied from the European zone (Denmark, Spain, and UEFA Standards), America, Asia-Oceania zone (Korea and Australia), and Brazil. According to the age levels in the study, they range from U-17 players, U-20 players, College Students, to Seniors. Female professional soccer players cover long distances and perform high-intensity training like male players and that there are differences in movement patterns for each position. Therefore, to improve the performance of female soccer players and prevent injuries, it is necessary to develop training programs that take into account the characteristics of each player and playing position.*

Keywords: *Sprint, distance covered, female, soccer.*

Introduction

Scholarly interest in women's football has increased over recent years (Harkness-Armstrong et al., 2022). One of the topics attracting more attention in the literature concerns the analysis of the compatibility of locomotor activity performed across different speeds. However, even with the growing interest in sports science and performance, a thorough understanding of the physical demands of female soccer athletes has yet to be widely explored (Castellano et al., 2011; Loturco et al., 2015; Ramirez-Campillo et al., 2016). Scientific research on female soccer athletes remains scarce, especially at the professional level (Faul et al., 2007), Additionally, much of the research that has been published to date has been completed using small sample sizes concerning the number of players, number of matches, or both (McCormack et al., 2014). There has been huge global growth and development in women's football in recent years. Global, continental and national government bodies have implemented women-specific football strategies and increased investment, to support the development of the sport from the grassroots level to elite playing standards (FIFA, 2018, 2019).

Although the popularity of women's football is lower than men's football, recently it has increased rapidly compared to before. The number of studies on women's football is increasing as the popularity of women's football increases. The performance ratio for each intensity exercise, such as standing, walking, jogging, high-intensity running, and sprinting in women's soccer matches is the same as that performed by men's soccer players (Fessi et al., 2016; Mohr et al., 2008). However, men and women can differ dramatically in terms of physical performance characteristics, with male players undertaking 30% more high-intensity activity during competition (Mohr et al., 2008), and demonstrating superior performance across a variety of fitness assessments (Mujika, Santisteban, et al., 2009; Mujika, Spencer, et al., 2009; Tønnessen et al., 2014).

The physical dimension has been studied more deeply than any other dimension during football competition. Several studies measure the physical characteristics of players for each 15-minute time period, which observed, on

the one hand, the first 15 minutes of a match are consistently the most demanding period, and on the other hand, a decline in performance in various variables, such as the total distance covered undertaken, running or sprinting at high speed as the game progresses, especially in the last 15 minutes of the game period (Hewitt et al., 2014; Mara et al., 2017). Across all tracking systems, the total distance covered is usually in the range of 9.2-11.3 km, while the distance covered by high-speed running is in the range of 1.2-2.7 km and the sprint range is 160-460 m. Several studies have investigated the demands of the game and found differences between the two playing positions. However, most previous studies have used less specific positional categorization, using defenders, midfielders and attackers (Bendiksen et al., 2013; Bradley et al., 2014).

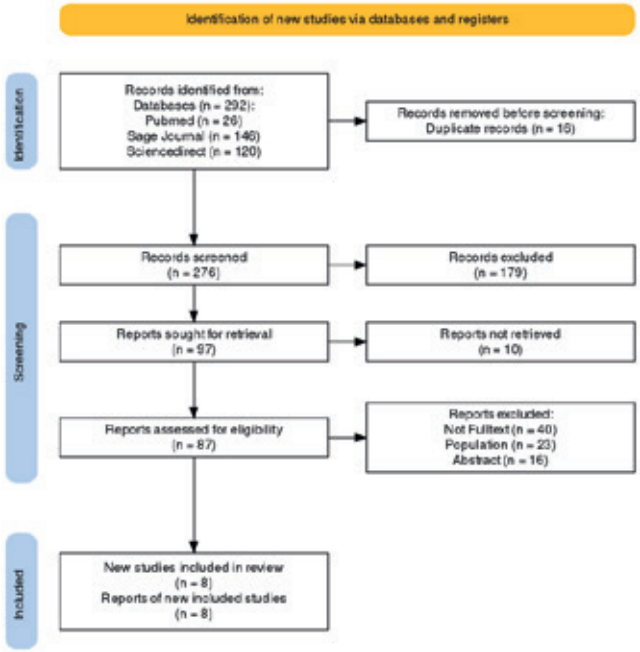
Thus, the aerobic and anaerobic needs of female soccer athletes need to be considered during the competition season so that fatigue does not occur which could put the athletes at risk of injury. Because injuries to elite soccer players occur more often at the end of the season than at the beginning and middle of the season (Morgan & Oberlander, 2001). It can also be used as a reference in choosing the right strategy for creating a training program by paying attention to the tactical aspects of the game. Therefore, the purpose of writing this review is to increase our understanding of the physical demands of women's soccer matches, especially the differences in sprint ratio and distance covered during matches with higher standards of play and between playing positions, which is necessary for coaches and sports scientists to prescribe more appropriate training to maximize performance and minimize the risk of injury.

Material And Methods

The systematic review was conducted by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Statement. An electronic systematic search of databases (Elsevier, PubMed, and Sage Journals) was completed on February 21, 2024, with no date restrictions applied. The search strategy included terms for population ('female' OR 'girl' OR 'women'), AND sport ('soccer' OR 'football'), AND sprint characteristics ('Sprint') AND, cruising range ('distance covered'). The search strategy has previously been planned with PICOC analysis which can be seen in the following table:

Table 1. *Study search method with PICOC analysis*

Population	Soccer female athlete
Intervetion	Match Analysis
Compare	n/a
Outcome	Sprint dan Distance covered
Context	Ratio *sprint* and distance covered during a match



Electronic database searches identified 292 articles. A total of 16 articles remained for analysis after removal of duplicates, and initial and full-text screening. Then the number of articles was screened through several stages regarding the planned inclusion criteria and 8 articles met the inclusion criteria.

Figure 1. *Flow diagram search database (Haddaway et al., 2022)*

Result

Population Distribution

Table 2 shows the population distribution in the 8 studies that met the inclusion criteria. Based on playing standards, the population is divided into semi-professionals, professionals, domestic and international players, national teams, and student or college classes. The locations of the studies varied from the European zone (Denmark, Spain, and UEFA Standards), America, the Asia-Oceania zone (Korea and Australia), and Brazil. According to the age levels in the study, they range from U-17 players, U-20 players, College Students, to Seniors. The average age of the players from the youngest is 15.6 years to 27.8 years.

Table 2. *Population distribution in the study*

Study	Years	Country/Location	Group	Standard/Class	Age
(Panduro et al., 2022)	2022	Denmark	Senior	Semi-Profesional	22.5± 4.2 years
(Griffin et al., 2021)	2021	Australia	Senior	Domestic dan Internasional	25.7 ± 3.1 years
(Ramos et al., 2019)	2019	Brazil	U-17, U-20, and Senior	National Team	15.6 ± 0.5, 18.1 ± 0.8, dan 27 ± 4.5 years
(Sausaman et al., 2019)	2019	Amerika	College Student	NCAA	20.6 ± 1.0 years
(Errekagorri et al., 2022)	2022	Spanyol	Senior	Semi-Profesional	24.6 ± 4.0 years
(Choi & Joo, 2022)	2022	Korea	Senior	Profesional	27.8 ± 3.9 years
(Riboli et al., 2024)	2024	Eropa	Senior	Profesional	n/a
(Fernandes et al., 2022)	2022	Portugal	Senior	Profesional	24.6 ± 2.3 years

Sprint Ratio During a Match

The characteristics of sprinting during a match vary, in table 3 you can see a picture of the average sprint distance of players divided by playing position. The Forward position is the position with the highest average total sprint distance, the midfielder position has the middle sprint distance and the smallest is the defender position. Judging from the player's standards, the average sprint distance performed by the player is following the level or standard of play. Then the sprint ratio can also be differentiated based on the match round where players sprint more in the first half of the match.

Table 3. *Sprint characteristics of female soccer athletes during a match*

Study	Standard	Sprint Characteristic (m)							
		Based on Playing Position				Based on Match Round		Based on level	
		GK	DF	MF	FW	1st Half	2nd Half	D	I
(Ramos et al., 2019)	National team	-	198.8	298.5	351.7	-	-	-	-
(Sausaman et al., 2019)	NCAA	-	385	267	633	-	-	-	-
(Griffin et al., 2021)	Domestic dan International	-	-	-	-	-	-	306.3	363.7
(Choi & Joo, 2022)	Profesional	-	56.3 (CB) 117.6 (FB)	51.2	236.2 (WF) 184.3 (CF)	110.2	96.9	-	-
(Panduro et al., 2022)	Semi-Profesional	1	65	124	56	-	-	-	-
(Errekagorri et al., 2022)	Semi-Profesional	-	-	-	-	1463	1205.5	-	-

NB: Goalkeeper (GK), Defender (DF), Midfielder (MF), Forward (FW), Domestik (D), Internasional (I), Fullback (FB), Wing Forward (WF)

Total Distance Covered During the Game

The characteristics of sprinting during a match vary, in table 4 you can see a picture of the average total cruising power of players divided by playing position. The MF position is the position with the highest average total sprint distance, the DF position has the middle sprint distance and the smallest is the FW position. Judging from the player's standards, the average distance travelled by the player is under the level or standard of play. Then the exploration ratio can also be differentiated based on the match round where players explore more of the game area in the first round of the match.

Table 4. *Distance covered characteristics of female soccer athletes during a match*

Study	Standard	Distance Covered (m)							
		Based on Playing Position				Based on Match Round		Based on level	
		GK	DF	MF	FW	1st Half	2nd Half	D	I
(Ramos et al., 2019)	National team	-	10,237.8	10,376.5	9,825.1	-	-	-	-
(Sausaman et al., 2019)	NCAA	-	9039	9536	9882	-	-	-	-
(Griffin et al., 2021)	Domestic dan International	-	-	-	-	-	-	8727.5	9432.5
(Choi & Joo, 2022)	Profesional	-	8800 (CB) 9900 (FB)	10500	9200 (WF) 9200 (CF)	9500	9600	-	-
(Panduro et al., 2022)	Semi-Profesional	-	9274	10572	9745	-	-	-	-
(Errekagorri et al., 2022)	Semi-Profesional	-	-	-	-	15,658.1	14,014.5	-	-

Note: Goalkeeper (GK), Defender (DF), Midfielder (MF), Forward (FW), Domestik (D), Internasional (I), Fullback (FB), Wing Forward (WF)

Discussion

This research was conducted to analyze the activities of female soccer players during matches. Female professional soccer players cover distances of more than 9.5 km and 400 m of high-intensity running per game. The position that covers the furthest movement distance during a match is the Midfielder (MF), and the movement distance for each training intensity varies, depending on the position. This is inconsistent with previous research because it was reported that FW players can reach the furthest distance when running (Dellal et al., 2010, 2011). No significant differences were seen in all scores between the first and second halves of the season, as well as between home and away games. In line with previous research, this review revealed that players competing in international matches demonstrated higher speed and total running distance when compared to players in domestic competitions (Gabbett & Mulvey, 2008).

Soccer players are required to have specific physical demands in each position due to the characteristics of the playing style and tactics used by the team (Abbott et al., 2018). In the current research, the position that covers the furthest distance in a match is MF, and vice versa for the Central Back (CB) position. The position that covers the furthest distance in a match is midfield, followed by the defensive and attacking positions (Vigne et al., 2010). The midfielder moves the furthest during the game, which is closely related to the activity area on the pitch in the MF position. MF is actively involved in both attacking and defensive situations compared to other positions. CBs performed the shortest cover during the match, which is also related to their tactical movement patterns. During the 5-minute peak period, CBs typically have the least total distance (TD) (Harkness-Armstrong et al., 2021; Trewin et al., 2018). The CB's main role is to play and block opposing attackers rather than taking part in the attack. Therefore, CB requires less activity in attacking situations compared to other positions.

Then among playing standards, college players cover the highest relative TD (Benjamin et al., 2020; Bozzini

et al., 2020; Wells et al., 2015), while senior international players cover more TD (Meylan et al., 2017), than senior domestic players (Julian et al., 2021; Romero-Moraleda et al., 2021), and young players cover relative TD smallest. Regarding the tactical dimension, it should be noted that although there is an increasing trend in the first part and a decreasing trend in the second part, there are no significant differences in the average values of the match period in any of the tactical variables. The team showed an increase in defensive width, length and height values from the start of the match to the break. In the second half, teams tended to play more compactly and compactly at a defensive level that got closer to their goal as the match progressed. One understanding is related to the superiority demonstrated by a team throughout the season, which on many occasions, took the lead in the final part of the match, causing the opponent to take the initiative in the match. The rivals, in particular, but also the situational variables, are part of the activity of playing a football match (Carling, 2013; Castellano et al., 2022).

Generally, higher win rates in football are observed during home games due to home advantage (Pollard & Pollard, 2005). Players can cover more running distance and high-intensity training during home games than away games due to the familiar stadium environment and support from fans. Since participating teams usually dominate matches with a higher level of ball possession compared to opposing teams, not only in home matches but also in the unfamiliar environment of away matches, match activity will not differ significantly between home and away matches in this study. However, in this study, there were no differences in all the variables measured, including the total distance in home and away matches. Previous research has shown that the amount of movement (>14.4 km/h) in a winning situation during a match is less than in a draw situation (Buchheit et al., 2018).

It has been demonstrated that the physical demands of women's soccer increase linearly as the standard of the game progresses from youth to college and beyond college to professional and international levels (Andersson Helena Åand Randers et al., 2010; Krustrup et al., 2005; Mohr et al., 2008; Vescovi & Favero, 2014). The need to improve football-specific fitness components to improve players across standards is apparent. Intermittent endurance training and the ability to sprint repeatedly are highly correlated with match performance, especially with the ability to perform high-intensity work, the assessment of which players often use field tests and the implementation of training strategies aimed at improving these components of fitness (e.g., prescribing training high-intensity intervals) is highly recommended. If intensity management is unbalanced, players may experience an increased risk of injury, decreased aerobic capacity, and reduced performance(Silva et al., 2016). Exposure to high workloads has a real possibility of resulting in non-functional overreaching or overtraining(Banister & Calvert, 1980; Cunanan et al., 2018), possibly increasing the risk of overtraining injuries (Gabbett & Jenkins, 2011). Also importantly, rapid and repeated decelerations after sprinting can be one of the main causes of post-competition muscle damage (Howatson & Milak, 2009).

This analysis or review has several practical applications. In practice, coaches and sports scientists can utilize the most demanding sections determined during official matches as a reference for training prescriptions and performance development during daily routines on the field. The results of the current study show that female professional soccer players cover long distances and perform high-intensity training like male players and that there are differences in movement patterns for each position. Therefore, to improve the performance of female soccer players and prevent injuries, it is necessary to develop training programs that take into account the characteristics of each player and playing position.

This review has presented the overall limitations of the study, and caution is needed when interpreting the results or informing practical applications. For example, this review has identified key methodological limitations in the literature that limit comparisons between studies, including; single team samples; and different data collection methods; and there are no standard speeds and acceleration/deceleration thresholds. The heterogeneity of the sample of included studies precluded the inclusion of the meta-analysis in the current systematic review. Given the large current of existing reviews summarizing all the characteristics of sprinting and cruising during a match, across the standards of the women's football game, there are very mixed and perhaps exaggerated results. However, given the growth, development and recent investment in women's football, the author strongly believes that there is an appropriate need at the time of this review to gather all the current evidence regarding the characteristics of the women's game and provide practitioners with an important resource with which to develop information evidence of practice in a female soccer population.

Conclusion

Quantifying and understanding sprint and distance covered characteristics in match-play is important to inform practice across the female soccer population. Furthermore, this review provides critical evidence-based resources that can be used to inform population-specific practices across the standard areas of the women's game of football. Additionally, further evidence is needed regarding contextual factors in match play, to understand how the characteristics players encounter during match play vary. Future research might also seek to improve our understanding of match-to-match variation within the female soccer population.

Reference

Abbott, W., Brickley, G., & Smeeton, N. J. (2018). *Physical demands of playing position within English Premier League academy soccer*.

Andersson Helena Åand Randers, M. B., Heiner-Møller, A., Krustrup, P., & Mohr, M. (2010). Elite female soccer players perform more high-intensity running when playing in international games compared with domestic league games. *The Journal of Strength \& Conditioning Research*, *24*(4), 912–919.

Banister, E. W., & Calvert, T. W. (1980). Planning for future performance: implications for long term training. *Canadian Journal of Applied Sport Sciences. Journal Canadien Des Sciences Appliquees Au Sport*, *5*(3), 170–176.

Bendiksen, M., Pettersen, S. A., Ingebrigtsen, J., Randers, M. B., Brito, J., Mohr, M., Bangsbo, J., & Krustrup, P. (2013). Application of the Copenhagen Soccer Test in high-level women players - locomotor activities, physiological response and sprint performance. *Human Movement Science*, *32*(6), 1430–1442. https://doi.org/10.1016/J.HUMOV.2013.07.011

Benjamin, C. L., Hosokawa, Y., Curtis, R. M., Schaefer, D. A., Bergin, R. T., Abegg, M. R., & Casa, D. J. (2020). Environmental conditions, preseason fitness levels, and game workload: analysis of a female NCAA DI national championship soccer season. *The Journal of Strength \& Conditioning Research*, *34*(4), 988–994.

Bozzini, B. N., McFadden, B. A., Walker, A. J., & Arent, S. M. (2020). Varying Demands and Quality of Play Between In-Conference and Out-of-Conference Games in Division I Collegiate Women's Soccer. *The Journal of Strength \& Conditioning Research*, *34*(12), 3364–3368.

Bradley, P. S., Dellal, A., Mohr, M., Castellano, J., & Wilkie, A. (2014). Gender differences in match performance characteristics of soccer players competing in the UEFA Champions League. *Human Movement Science*, *33*, 159–171.

Buchheit, M., Modunotti, M., Stafford, K., Gregson, W., & Di Salvo, V. (2018). Match running performance in professional soccer players: effect of match status and goal difference. *Sport Perform Sci Rep*, *1*(21), 1–3.

Carling, C. (2013). Interpreting physical performance in professional soccer match-play: should we be more pragmatic in our approach? *Sports Medicine*, *43*, 655–663.

Castellano, J., Blanco-Villaseñor, A., & Alvarez, D. (2011). Contextual variables and time-motion analysis in soccer. *International Journal of Sports Medicine*, 415–421.

Castellano, J., Errekagorri, I., Los Arcos, A., Casamichana, D., Mart\'\in-Garcia, A., Clemente, F., López-Del Campo, R., Resta, R., & Echeazarra, I. (2022). Tell me how and where you play football and I'll tell you how much you have to run. *Biology of Sport*, *39*(3), 607–614.

Choi, J.-H., & Joo, C.-H. (2022). Match activity profile of professional female soccer players during a season. *Journal of Exercise Rehabilitation*, *18*(5), 324–329. https://doi.org/10.12965/jer.2244354.177

Cunanan, A. J., DeWeese, B. H., Wagle, J. P., Carroll, K. M., Sausaman, R., Hornsby, W. G., Haff, G. G., Triplett, N. T., Pierce, K. C., & Stone, M. H. (2018). The general adaptation syndrome: a foundation for the concept of periodization. *Sports Medicine*, *48*, 787–797.

Dellal, A., Chamari, K., Wong, D. P., Ahmaidi, S., Keller, D., Barros, R., Bisciotti, G. N., & Carling, C. (2011). Comparison of physical and technical performance in European soccer match-play: FA Premier League and La Liga. *European Journal of Sport Science*, *11*(1), 51–59.

Dellal, A., Wong, del P., Moalla, W., & Chamari, K. (2010). Physical and technical activity of soccer players in the French First League-with special reference to their playing position. *International SportMed Journal*, *11*(2), 278–290.

Errekagorri, I., Echeazarra, I., Olaizola, A., & Castellano, J. (2022). Evaluating Physical and Tactical Performance and Their Connection during Female Soccer Matches Using Global Positioning Systems. *Sensors (Basel, Switzerland)*, *23*(1). https://doi.org/10.3390/s23010069

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*(2), 175–191.

Fernandes, R., Martins, A. D., Clemente, F. M., Brito, J. P., Nobari, H., Reis, V., & Oliveira, R. (2022). Variations of distance and accelerometry-based GPS measures and their influence on body composition in professional women soccer players. *Proceedings of the Institution of Mechanical Engineers, Part P: Journal of Sports Engineering and Technology*, *0*(0), 17543371221122076. https://doi.org/10.1177/17543371221122076

Fessi, M. S., Zarrouk, N., Di Salvo, V., Filetti, C., Barker, A. R., & Moalla, W. (2016). Effects of tapering on physical match activities in professional soccer players. *Journal of Sports Sciences*, *34*(24), 2189–2194.

FIFA. (2018). *Fe´de´ration Internationale de Football Association (FIFA). Women's football strategy.*

FIFA. (2019). Women's Football Member Associations Survey Report. *Federation Internationale de Football Association*, 1–113. https://img.fifa.com/image/upload/nq3ensohyxpuxovcovj0.pdf

Gabbett, T. J., & Jenkins, D. G. (2011). Relationship between training load and injury in professional rugby league players. *Journal of Science and Medicine in Sport*, *14*(3), 204–209.

Gabbett, T. J., & Mulvey, M. J. (2008). Time-motion analysis of small-sided training games and competition in elite women soccer players. *The Journal of Strength \& Conditioning Research*, *22*(2), 543–552.

Griffin, J., Newans, T., Horan, S., Keogh, J., Andreatta, M., & Minahan, C. (2021). Acceleration and High-Speed Running Profiles of Women's International and Domestic Football Matches. *Frontiers in Sports and Active Living*, *3*, 604605. https://doi.org/10.3389/fspor.2021.604605

Haddaway, N. R., Page, M. J., Pritchard, C. C., & McGuinness, L. A. (2022). PRISMA2020: An R package and Shiny app for producing PRISMA 2020-compliant flow diagrams, with interactivity for optimised digital transparency and Open Synthesis. *Campbell Systematic Reviews*, *18*(2), e1230. https://doi.org/https://doi.org/10.1002/cl2.1230

Harkness-Armstrong, A., Till, K., Datson, N., & Emmonds, S. (2021). Whole and peak physical characteristics of elite youth female soccer match-play. *Journal of Sports Sciences*, *39*(12), 1320–1329.

Harkness-Armstrong, A., Till, K., Datson, N., Myhill, N., & Emmonds, S. (2022). A systematic review of match-play characteristics in women's soccer. In *PLoS ONE* (Vol. 17, Issue 6 June). https://doi.org/10.1371/journal.pone.0268334

Hewitt, A., Norton, K., & Lyons, K. (2014). Movement profiles of elite women soccer players during international matches and the effect of opposition's team ranking. *Journal of Sports Sciences*, *32*(20), 1874–1880. https://doi.org/10.1080/02640414.2014.898854

Howatson, G., & Milak, A. (2009). Exercise-induced muscle damage following a bout of sport specific repeated sprints. *The Journal of Strength \& Conditioning Research*, *23*(8), 2419–2424.

Julian, R., Skorski, S., Hecksteden, A., Pfeifer, C., Bradley, P. S., Schulze, E., & Meyer, T. (2021). Menstrual cycle phase and elite female soccer match-play: influence on various physical performance outputs. *Science and Medicine in Football*, *5*(2), 97–104.

Krustrup, P., Mohr, M., Ellingsgaard, H., & Bangsbo, J. (2005). Physical demands during an elite female soccer game: importance of training status. *Medicine \& Science in Sports \& Exercise*, *37*(7), 1242–1248.

Loturco, I., Pereira, L. A., Kobal, R., Zanetti, V., Kitamura, K., Abad, C. C. C., & Nakamura, F. Y. (2015). Transference effect of vertical and horizontal plyometrics on sprint performance of high-level U-20 soccer players. *Journal of Sports Sciences*, *33*(20), 2182–2191.

Mara, J. K., Thompson, K. G., Pumpa, K. L., & Morgan, S. (2017). Quantifying the high-speed running and sprinting profiles of elite female soccer players during competitive matches using an optical player tracking system. *The Journal of Strength \& Conditioning Research*, *31*(6), 1500–1508.

McCormack, W. P., Stout, J. R., Wells, A. J., Gonzalez, A. M., Mangine, G. T., Fragala, M. S., & Hoffman, J. R. (2014). Predictors of high-intensity running capacity in collegiate women during a soccer game. *The Journal of Strength \& Conditioning Research*, *28*(4), 964–970.

Meylan, C., Trewin, J., & McKean, K. (2017). Quantifying explosive actions in international women's soccer. *International Journal of Sports Physiology and Performance*, *12*(3), 310–315.

Mohr, M., Krustrup, P., Andersson, H., Kirkendal, D., & Bangsbo, J. (2008). Match activities of elite women soccer players at different performance levels. *Journal of Strength and Conditioning Research*, *22*(2), 341–349. https://doi.org/10.1519/JSC.0b013e318165fef6

Morgan, B. E., & Oberlander, M. A. (2001). An examination of injuries in major league soccer: the inaugural season. *The American Journal of Sports Medicine*, *29*(4), 426–430.

Mujika, I., Santisteban, J., Impellizzeri, F. M., & Castagna, C. (2009). Fitness determinants of success in men's and women's football. *Journal of Sports Sciences*, *27*(2), 107–114.

Mujika, I., Spencer, M., Santisteban, J., Goiriena, J. J., & Bishop, D. (2009). Age-related differences in repeated-sprint ability in highly trained youth football players. *Journal of Sports Sciences*, *27*(14), 1581–1590.

Panduro, J., Ermidis, G., Røddik, L., Vigh-Larsen, J. F., Madsen, E. E., Larsen, M. N., Pettersen, S. A., Krustrup, P., & Randers, M. B. (2022). Physical performance and loading for six playing positions in elite female football: full-game, end-game, and peak periods. *Scandinavian Journal of Medicine & Science in Sports*, *32 Suppl 1*, 115–126. https://doi.org/10.1111/sms.13877

Pollard, R., & Pollard, G. (2005). *Home advantage in soccer: A review of its existence and causes*.

Ramirez-Campillo, R., González-Jurado, J. A., Mart\'\inez, C., Nakamura, F. Y., Peñailillo, L., Meylan, C. M. P., Caniuqueo, A., Cañas-Jamet, R., Moran, J., Alonso-Mart\'\inez, A. M., & others. (2016). Effects of plyometric training and creatine supplementation on maximal-intensity exercise and endurance in female soccer players. *Journal of Science and Medicine in Sport*, *19*(8), 682–687.

Ramos, G. P., Nakamura, F. Y., Penna, E. M., Wilke, C. F., Pereira, L. A., Loturco, I., Capelli, L., Mahseredjian, F., Silami-Garcia, E., & Coimbra, C. C. (2019). Activity Profiles in U17, U20, and Senior Women's Brazilian National Soccer Teams During International Competitions: Are There Meaningful Differences? *Journal of Strength and Conditioning Research*, *33*(12), 3414–3422. https://doi.org/10.1519/JSC.0000000000002170

Riboli, A., Francini, L., Rossi, E., Caronti, A., Boldrini, L., & Mazzoni, S. (2024). Top-class women's soccer performance: peak demands and distribution of the match activities relative to maximal intensities during official matches. *Biology of Sport*, *41*(1), 207–215. https://doi.org/10.5114/biolsport.2024.129477

Romero-Moraleda, B., Nedergaard, N. J., Morencos, E., Casamichana, D., Ramirez-Campillo, R., & Vanrenterghem, J. (2021). External and internal loads during the competitive season in professional female soccer players according to their playing position: differences between training and competition. *Research in Sports Medicine*, *29*(5), 449–461.

Sausaman, R. W., Sams, M. L., Mizuguchi, S., DeWeese, B. H., & Stone, M. H. (2019). The Physical Demands of NCAA Division I Women's College Soccer. *Journal of Functional Morphology and Kinesiology*, *4*(4). https://doi.org/10.3390/jfmk4040073

Silva, J. R., Brito, J., Akenhead, R., & Nassis, G. P. (2016). The transition period in soccer: a window of opportunity. *Sports Medicine*, *46*, 305–313.

Tønnessen, E., Sylta, Ø., Haugen, T. A., Hem, E., Svendsen, I. S., & Seiler, S. (2014). The road to gold: training and peaking characteristics in the year prior to a gold medal endurance performance. *PloS One*, *9*(7), e101796.

Trewin, J., Meylan, C., Varley, M. C., & Cronin, J. (2018). The match-to-match variation of match-running in elite female soccer. *Journal of Science and Medicine in Sport*, *21*(2), 196–201.

Vescovi, J. D., & Favero, T. G. (2014). Motion characteristics of women's college soccer matches: Female Athletes in Motion (FAiM) study. *International Journal of Sports Physiology and Performance*, *9*(3), 405–414.

Vigne, G., Gaudino, C., Rogowski, I., Alloatti, G., & Hautier, C. (2010). Activity profile in elite Italian soccer team. *International Journal of Sports Medicine*, 304–310.

Wells, A. J., Hoffman, J. R., Beyer, K. S., Hoffman, M. W., Jajtner, A. R., Fukuda, D. H., & Stout, J. R. (2015). Regular-and postseason comparisons of playing time and measures of running performance in NCAA Division I women soccer players. *Applied Physiology, Nutrition, and Metabolism*, *40*(9), 907–917.

Primljen: 08. mart 2024. / Received: March 08, 2024
Prihvaćen: 18. mart 2024. / Accepted: March 08, 2024