SportMont

ORIGINAL SCIENTIFIC PAPER

Distance Covered and Movement Intensities of Football Players at the 2022 World Cup in Qatar – Differences According to Game Positions

Ekrem Čolakhodžić[1], Adnan Ademović[1], Amer Hero[1]

AFFILIATIONS

[1]Džemal Bijedić University of Mostar, Faculty of Education, Mostar, Bosnia and Herzegovina

CORRESPONDENCE

E. Čolakhodžić, Džemal Bijedić University of Mostar, Faculty of Education, URSC Midhat Hujdur Hujka, 881204 Mostar, Bosnia and Herzegovina, *ekrem.colakhodzic@unmo.ba*

Abstract

Modern football is characterized by playing both in defense and attack, which requires greater energy demands from players, and the amount and intensity of movement increases from year to year. The aim of the study was to determine differences in the distance covered and movement intensities of players in relation to their position in the team. The sample was players who played all 90 minutes of the knockout phase of the 2022 World Cup (N=224), according to positions: goalkeepers (n=31), defense (n=101), midfielders (n=61), and attackers (n=31). Data were taken from the official FIFA website (www.fifa.com): distance covered (m), distance covered in zone 1 (speed 0-7 km/h), in zone 2 (7-15 km/h), in zone 3 (15-20 km/h), in zone 4 (20-25 km/h) and in zone 5 (>25 km/h), number of runs in zone 4, number of sprints in zone 5, maximum achieved speed (km/h). Differences between positions were determined by discriminant analysis. Three discriminant functions were isolated that are statistically significant at the 99% level (sig.=0.000) (Can. Cor.=0.934; Can. Cor =0.492 and Can. Cor.=0.356). The highest correlations with the first function, which maximally differentiates positions (Wilks Lambda =0.085; sig.=0.000), have the variables: intensity of movement in zone 2, number of runs in zone 4 and total distance covered. The second function (Wilks Lambda =0.662; sig.=0.000) is determined by the maximum achieved speed and distance covered in zone 3. The third function (Wilks Lambda =0.873; sig.0.000) is determined by intensity of movement in zone 4, number of sprints, distance covered in zone 5 and in zone 1. Excluding the goalkeeper position, it is evident that positions in the team are approaching each other in relation to distance covered, intensity of movement and maximum speed of movement, which supports the thesis that in modern football, polyvalent football players who can be used in multiple positions in the team are increasingly profiled.

Keywords: *distance covered, speed, football, player positions*

Introduction

Modern football is characterized by active play in both defense and attack, which increases the energy demands of the players, while the amount and intensity of movement increases from year to year (Bangsbo, 1994; Mohr, Krustrup, & Bangsbo, 2005). Top-level matches are characterized by activities dominated by rapid movement of all players, with the aerobic-anaerobic abilities of the players playing a key role (Bloomfield, Polman, & O'Donoghue, 2005; Rienzi, Drust, Reilly, Carter, & Martin, 2000). The developed physical abilities of football players often lead to formations in which a large number of players are located in the same part of the field, in a space of about forty meters ("shallow" formations) (Barros et al., 2007; Di Salvo et al., 2007). Due to these requirements, modern football strives for versatile players, who can perform tasks in both defense and attack with quality, with positional specificities (goalkeeper, midfielder, defender, striker) (Ademović, Čolakhodžić, Palić & Bajrić, 2024; Čolakhodžić et al., 2017).

In terms of movement, top players cover an average distance of 9 km to 14 km during a match (Barros et al., 2007; Bloomfield et al., 2005; Di Salvo et al., 2007; Lago, Casais, Domínguez, & Sampaio, 2010; Mohr et al., 2005; Rampinini et all., 2007). The average speed of movement, if constant, is around 6.5–8 km/h, which corresponds to a light jog (Barros et al., 2007; Bloomfield et al., 2005). Since speed is constantly changing during the game, the total distance covered needs to be broken down by the intensity of movement.

Soccer match play is characterized by short linear high-velocity actions and multidirectional accelerations and decelerations, mixed with lower intensity recovery breaks of longer duration (Bradley et al., 2013; Bortnik et al., 2024). Analyzing a Champions League match shows that top players spend around 58% of their time standing or walking (15% standing, 43% walking), about 30% of the time jogging (7–14 km/h), about 8% at a moderate pace (15–19 km/h), about 3% at a high speed (20–25% at a fast pace, and about 3% at a high speed (20–25% at a fast sprint) (Bangsbo, Mohr, & Krustrup, 2006). Converted to distance, which means that players walk about 4 km, jog about 4.5 km, cover about 1.8 km at a moderate pace, about 0.7 km at a fast pace, and about 0.3 km sprint (Lago et al., 2010; Rampinini et al., 2007).

Different player positions show specific movement patterns. Central defenders cover less high-intensity distance than midfielders and attackers, because they rarely reach the anaerobic threshold (about 14 km/h) (Bangsbo, 1994; Mohr, Krustrup, & Bangsbo, 2003). Midfielders perform a significantly higher number of ball activities and cover the greatest total distance (Bangsbo et al., 2006; Čolakhodžić, 2019; Mohr et al., 2005). It has been observed that all players show a decrease in high-intensity activities towards matches, which indicates the use of maximal physical capacity during the game (Bangsbo, 1994; Mohr et al., 2003). Players' activities during a match are divided into ball and non-ball activities, with non-ball activities accounting for over 95% of the effective playing time (Mohr et al., 2005). Most of the physical work consists of walking and running at different speeds and directions, which is used as a global indicator of the physical demands of the game (Rampinini et al., 2007).

In recent years, research focused on the specific movement demands of positions has highlighted significant differences in the physical performance of players in elite football. A systematic review of the literature shows that mid- and outside players cover greater total distances and have a greater number of sprints and high-intensity actions compared to central defenders and forwards (Sarmento et al., 2024). Recent analyzes of acceleration and velocity profiles of players also indicate that outside players and forwards show higher values of intensive accelerations, while central players record less intensive actions per minute of play (Garrosa et al., 2025; González Rodenas et al., 2025). Additionally, studies using GPS and advanced video motion tracking systems show that acceleration, maximum speed, and distance characteristics at high intensities are statistically significantly different between positions, indicating the need for positionally adapted training (Čaušević et al., 2025)

However, despite these important contributions, there is limited data that specifically addresses the analysis of positional player movement in the context of major international tournaments such as the World Cup, where the tactical dynamics, match intensity, and physiological demands may differ significantly from league competitions. Precisely because of this gaps in the literature justify the need for this study focused on the analysis of the amount and intensity of movement of top soccer players according to their position at the World Cup in Qatar in 2022.

Methods

Procedures

For the purposes of this research, official national team data from the official FIFA website (www.fifa.com) from the last World Cup held in Qatar in 2022 was taken.

Research sample

The research included a sample of top football players who played in the round of 16, quarter-finals, semi-finals, third-place play-off and final matches of the 2022 World Cup in Qatar (N=224). The national teams that participated in the finals were: Netherlands, United States, Argentina, Australia, Japan, Croatia, Brazil, South Korea, England, Senegal, France, Poland, Morocco, Spain, Portugal and Switzerland. Only those football players who were part of the starting lineups of the national teams and played all 90 minutes were included in the final analysis. The sample was divided into subsamples based on the position in the game: goalkeepers (n=31), defenders (n=101), midfielders (n=61), and forwards (n=31).

Sample variables

The data for this research was taken from the official website of the World Football Association FIFA (www.fifa.com), which presents all the parameters of the teams' performance in the matches of the 2022 World Cup in Qatar (table 1).

Table 1. Sample of research variables

No.	Variables
1.	Age (years)
2.	Height (cm)
3.	Total distance covered during the match (m)
4.	Zone 1 – distance covered in zone 1 (speed 0-7 km/h)
5.	Zone 2 – distance covered in zone 2 (speed 7-15 km/h)

(continued from previous page)

Table 1. Sample of research variables

6.	Zone 3 – distance covered in zone 3 (speed 15-20 km/h)
7.	Zone 4 – distance covered in zone 4 (speed 20-25 km/h)
8.	Zone 5 – distance covered in zone 5 (speed >25 km/h)
9.	High speed runs (No.) – number of runs in zone 4 (No.)
10.	Sprints (No.) – number of sprints in zone 5 (No)
11.	Top speed (km/h) – maximum speed achieved (km/h)

Statistics

Data were processed using IBM SPSS statistical software SPSS (version 26.0, SPSS Inc., Chicago, IL, USA) with a significance threshold set at $p<0.05$. Central and dispersion parameters were calculated for all variables, while differences between different positions in the team were determined using canonical discriminant analysis. The criterion for the discriminant power of the applied variables is Wilks' lambda. This method was applied because it allows simultaneous examination of the influence of several dependent variables on the classification of players according to positions in the game.

Results

The results of this study are presented in Table 2, which shows the parameters of distance covered and movement intensity of football players of different positions during the knockout phase of the 2022 World Cup in Qatar. The results clearly indicate significant differences in distance covered and movement intensities among players of different positions over time and confirm known trends from previous studies that the total distance covered, as well as the distribution of distance covered by intensity zones, differ significantly depending on the tactical role and position of the player on the field.

Goalkeepers, as expected, recorded the lowest values in almost all analyzed variables. The average total distance covered by goalkeepers was 5130.07±907.05 m, with a dominant share of low-intensity movement (Zone 1 =4003.51±752.41 m), while the distances in high-intensity zones (Zone 4 and 5) were minimal. Defenders achieved an average distance covered of 10803.95±1457.74 m, with a pronounced participation of Zones 2 and 3 (moderate intensity). The maximum speed of defenders (31.57±1.68 km/h) indicates occasional quick reactions in the pressing phase or return to defense. Midfielders, as expected, achieved the highest total distance run (12,325.34±1,605.73 m), and the most pronounced activity in zone 2 (5,583.88±1,012.97 m) and zone 3 (1,757.07±437.44 m), in zone 3 (1,757.07±437.44 m), in the largest number (54.83±1.54 sprints). The attackers achieved an average distance of 10,723.53±1,459.67 m, with pronounced values in the high-intensity zones (Zone 4 =667.84±200.35 m; Zone 5 =235.00±135.75 m) and a speed of 16±16 km from the maximum.

Table 2. Arithmetic means and standard deviations of variables by team position

Variables	Goalkeepers (n=31)		Defense (n=101)		Midfield (n=61)		Offense (n=31)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age (Years)	30.67	3.37	28.01	4.44	27.62	4.16	28.46	4.72
Hight (m)	1.90	0.05	1.83	0.06	1.81	0.05	1.79	0.07
Total distance covered (m)	5130.07	907.05	10802.95	1457.74	12325.34	1605.73	10723.53	1459.67
Zone 1	4003.51	752.41	4264.91	712.60	4076.46	740.29	4417.14	925.73
Zone 2	985.89	292.34	4516.58	760.06	5583.88	102.97	4016.56	1049.66
Zone 3	110.50	48.64	1238.93	286.63	1757.07	437.44	1385.87	376.93
Zone 4	26.83	19.41	560.347	178.35	708.88	160.16	667.84	200.35
Zone 5	3.33	11.48	220.34	124.95	201.92	118.15	235.00	135.75
High speed runs (No.)	13.45	6.04	112.30	24.84	152.13	28.81	123.25	29.73
Sprints (No.)	2.83	1.71	45.34	13.57	54.83	11.54	51.67	14.27
Top speed (km/h)	23.89	2.37	31.57	1.68	31.02	1.66	31.20	1.96

Tables 3-7 analyze the differences between groups of football players divided by team positions, as well as the variables in which the positions differ the most. The criterion for the discriminative strength of the applied variables was the so-called Wilks' Lambda (table 5) which is significant at the 99% level (Sig=0.00). The determination of the significance of each discriminative variable was performed based on Bartlett's Chi-square test. Table 3 (Box's M-test) tested the similarity of the covariance matrices between the four groups, i.e. team positions. We see that the difference in the covariance matrices is significant (Sig=0.000) at the 99% level, which is a condition for us to proceed to the further procedure of canonical discriminant analysis. The results of the discriminant analysis (table 4) show that three discriminant functions were obtained that have a significant high value (Can. Correlation =0.934; Can. Correlation =0.492 and Can. Correlation =0.356), which indicates the correlation between the data set on which we performed the discriminant analysis and the results in the discriminant functions.

Table 3. Box's M test

Box's M		690.101
F	Approx.	5.841
	df1	108
	df2	34572.733
	Sig.	0.000

Note. Tests null hypothesis of equal population covariance matrices.

Table 4. Isolated canonical functions

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	6.805a	93.6	93.6	0.934
2	0.319a	4.4	98.0	0.492
3	0.145a	2.0	100.0	0.356

Note. a – First 3 canonical discriminant functions were used in the analysis

Table 5. Wilks' Lambda

Test of Function (s)	Wilks' Lambda	Chi-square	df	Sig.
1 through 3	0.085	535.317	24	0.000
2 through 3	0.662	89.436	14	0.000
3	0.873	29.388	6	0.000

Based on table 6, it can be seen that the highest correlations with the first isolated discriminant function, which maximally distinguishes positions in the team, have three variables that determine the total distance covered and movement intensity in Zone 4: Zone 2 - movement speed 7-15 km/h (0.643); number of runs in zone 4 (0.639); total distance covered (0.596). These variables distinguish the groups of football players the most, as evidenced by the value of Wilks' lambda (0.085; p=0.00).

Table 6. Isolated function structure matrix

Variables	Function		
	1	2	3
Zone 2 – (speed of movement 7-15 km/h)	0.643*	0.336	-0.507
High speed runs (No.) – number of runs in zone 4	0.639*	0.556	0.323
Total distance covered (m)	0.596*	0.210	0.021
Top speed (km/h)	0.520	-0.741*	0.281
Zone 3 – (speed of movement 15-20 km/h)	0.571	0.612*	0.289

(continued from previous page)

Table 6. Isolated function structure matrix

Zone 4 – (speed of movement 20-25 km/h)	0.498	0.176	0.647*
Sprints (No.) – number of sprints in zone 5	0.519	0.063	0.581*
Zone 5 – (speed of movement >25 km/h)	0.253	-0.362	0.369*
Zone 1 – (speed of movement 0-7 km/h)	0.026	-0.220	0.283*

Note. Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions. Variables ordered by absolute size of correlation within function; * Largest absolute correlation between each variable and any discriminant function.

The most dominant group of football players in this discriminative function (Table 7) are midfielders (1.950), then defenders (0.643), attackers (0.341) and finally goalkeepers who are at the negative pole of the function (-6.273). The second isolated discriminative function that also significantly distinguishes groups of football players (Wilks Lambda =0.662; p=0.000) is determined by the variables Maximum achieved speed km/h (-0.741) and speed of movement in Zone 3 (0.612), and the most dominant group is made up of midfielders (0.783), followed by goalkeepers (0.294), attackers (-0.061) and finally defenders (-0.544) who are at the negative pole of this function. The third discriminant function, which is also statistically significant (Wilks Lambda 0.873; p=0.000), is determined by high intensity variables: movement speed in Zone 4 (0.647), number of sprints in Zone 5 (0.581), movement speed in Zone 5 (0.369) and movement speed in Zone 1 (0.283), and the most dominant groups are attackers (0.939), followed by goalkeepers (-0.094), midfielders (-0.143) and finally defenders (-0.173), who are at the negative pole of this function.

Table 7. Group centroid function

Group	Function		
	1	2	3
Goalkeepers	-6.273	0.294	-0.094
Defense	0.643	-0.544	-0.173
Midfield	1.950	0.783	-0.143

Note. Unstandardized canonical discriminant functions evaluated at group means.

Discussion

The results of the study clearly showed that there are significant differences in the physical demands between football players of different positions in the game at the 2022 World Cup in Qatar. Analysis of the total distance covered, the distribution of movement speeds and the number of high-intensity activities revealed that these differences were expressed in almost all variables except in the low-intensity zone (0–7 km/h), where the difference was not significant (p=0.075). These results confirm that the position of the player in the team significantly affects the physiological profile and movement pattern during the match, which is in line with previous research by Bangsbo (1994), Di Salvo et al. (2007), and Mohr, Krustrup and Bangsbo (2003, 2005), who pointed to positional specificity in modern football.

The highest values of total distance covered were achieved by midfielders (12325.34±1605.73 m), followed by defenders (10802.95±1457.74 m) and attackers (10723.53±1459.67 m), while goalkeepers ran the least (5130.07±907.05 m). These results are in line with the literature (Bloomfield, Polman, & O'Donoghue, 2005; Rampinini et al., 2007), which states that midfielders perform the most diverse and energetically demanding tasks on the field, as they connect the defensive and attacking lines and often participate in both offensive and defensive phases of the game. Movement in medium and high speed zones (Zones 2-5) was most pronounced in midfielders, as confirmed by the results of canonical discriminant analysis (Wilks'λ=0.292, p<0.001). Zone 2 (7-15 km/h), zone 3 (15-20 km/h) and zone 4 (20-25 km/h) showed the most significant contribution to the differentiation of groups (Wilks' λ between 0.257 and 0.362, all p<0.001). This means that it is precisely medium and high intensity activities that most clearly differentiate typical movement patterns by position (Bjelica et al., 2025; Sarmento et al., 2024). The results of Box's M test (F=5.841, p<0.001) showed that the covariance matrices between the groups are not equal, which is expected given the pronounced positional heterogeneity in physical demands. The first canonical function, which explains as much as 93.6% of the total variance (eigenvalue =6.805, canonical correlation =0.934), showed that the variables that made the greatest contribution to the differentiation of positions were: distance covered in Zone 2 (7-15 km/h), number of high-intensity runs (Zone 4), total distance covered.

Based on the Group Centroid Function (Table 7), the first function clearly separates goalkeepers (negative centroid

-6.273) from outfield players, while midfielders are positioned with the highest positive centroid value (1.950), which confirms that they make the greatest total and intensive movements. The second function (4.4% of the variance) further separates midfielders from defenders, mostly through the variables of speed 15 - 20 km/h and maximum speed. The third function (2% of the variance) distinguishes attackers from other positions, predominantly through the number of sprints and activities in zones 4 and 5, which indicates the importance of explosiveness in the end of the game. Interpretation of the structure matrix (Table 6) shows that the highest correlations with the first function are the total distance covered and the number of runs in zone 4, while the second function reflects more speed abilities (top speed and movements of 15-20 km/h), and the third function distinguishes sprints and activities of the highest intensity (zones 4 and 5). This pattern indicates that the intensity and structure of movements are key factors in differentiating between positions in the game (Katanić et al., 2025a; Katanić et al. 2025b; Modric, Versic & Sekulic, 2020). These findings are in line with previous studies that emphasize that midfielders are the most physiologically loaded (Mohr, Krustrup, & Bangsbo, 2003; Rampinini et al., 2007), while attackers achieve similar total distances as defenders, but with a higher proportion of high-intensity activities. Goalkeepers, on the other hand, are distinguished by a specific movement pattern with a minimal number of sprints and a low total volume of activity. In modern football, there is an increasingly pronounced trend of reducing the differences between the lines, which is visible in the homogenization of maximum speeds (31.02-31.57 km/h for all field players). This indicates that the demands of the game are increasingly complex and that all players, regardless of position, must possess a high ability to move at high intensity with rapid regeneration.

The results obtained have significant practical implications for the training process. Coaches and fitness experts should individualize training programs according to positional requirements: for midfielders, the emphasis should be on developing aerobic capacity and recovery between high-intensity activities; for attackers, on explosiveness and sprint speed; for defenders, on short intense reactions and rapid movement in space; and for goalkeepers, on specific agility and reactive strength. The observed differences in distance covered and intensity of movement between positions can be explained by the specific energetic and neuromuscular demands arising from the players' tactical roles. Midfielders experience the highest workload due to their constant involvement in all phases of the game, which requires a dominant reliance on the aerobic energy system, with high aerobic capacity enabling the maintenance of a large volume of movement and more efficient recovery between medium and high intensity activities (Bangsbo, Mohr, & Krustrup, 2006; Rampinini et al., 2007). The higher proportion of high-intensity movements in attackers and defenders is associated with frequent explosive actions, sprints and sudden changes of direction, which primarily rely on anaerobic energy systems and a greater recruitment of fast-twitch muscle fibers, which is why the relative proportion of high-intensity activities is more pronounced despite the lower total distance (Andrzejewski, Chmura, Pluta, & Konarski, 2015; Barrera-Díaz & Clemente, 2024). The specific movement pattern of goalkeepers reflects their positional role, which is characterized by short, explosive reactions and minimal volume of continuous running, which is why indicators based on distance covered and speed zones do not fully reflect their actual physiological load (de Haan et al., 2025; Di Salvo et al., 2009; Morgans et al., 2024).

Limitations and future directions

This study should be viewed with some limitations. The first limitation is that goalkeepers were included in the analysis, although most previous studies of this type have excluded them due to the specific demands of their position. Although their inclusion provided a more complete insight into the positional structure of the team, indicators based on distance covered and speed zones do not fully reflect the actual physiological and neuromuscular workload of goalkeepers, which may limit direct comparability with existing literature.

A second limitation is that the classification of players by position is based on the traditional division (goalkeepers, defenders, midfielders, forwards), while modern analyses increasingly distinguish five or more positional roles (goalkeepers, central defenders, defenders, central midfielders, wingers, and forwards). Such a more detailed division could reveal more subtle differences in movement patterns and intensity of workload that are not fully captured by the classification used. Future studies should consider excluding goalkeepers from analyses based solely on locomotor indicators or using specific variables adapted to their position. It is also recommended to apply a finer positional classification, in accordance with the tactical role of the player, as well as combine movement data with physiological (e.g. heart rate) and neuromuscular indicators, in order to obtain a more complete picture of the actual demands of the game.

Conclusions

The results of this study showed that there were statistically significant differences in the amount and intensity of movement of football players of different positions at the 2022 World Cup in Qatar. The highest total volume of activity and the most pronounced intensity of movement were recorded in midfielders, while the lowest values were achieved by goalkeepers. Forwards and defenders showed similar values in the total distance covered, but with differences in the profile of speed activities and the manifestation of maximum movement speed. Discriminant analysis confirmed that the largest differences between positions arise from the share of medium and high intensity activities and the total distance covered during the match, while there are no significant differences in the maximum achieved speed between field players. The results obtained suggest that in modern football, a profile of a polyvalent player capable of meeting the demands of multiple positions in the team is developing. The training process in modern football should therefore be focused on developing the ability to perform high-intensity activities with rapid regeneration and recovery, which is the basis for the success of football players at the top level. Within football schools

and younger age groups, it is recommended that the training process focus on multifaceted motor and functional development, with gradual specialization towards positions in older ages. Such an approach enables the formation of a modern player with better fitness and tactical abilities, adaptable to the different demands of the game. Future research in this area could expand the analysis by including technical-tactical parameters (e.g. number of passes, duel success, pressing actions), which would provide a more comprehensive picture of the physical and functional demands of different positions in modern football.

Acknowledgments
There are no acknowledgments.

Conflicts of Interest
The authors declare no conflict of interest.

Received: 14 November 2025 | **Accepted:** 31 January 2026 | **Published:** 01 June 2026

References

Ademović, A., Čolakhodžić, E., Palić, A., & Bajrić, S. (2024). Structure of Football on the Basis of Situational Efficiency Indicators of World Championships 2010, 2014, 2018. *Sport Science and Health, 14*(1), 62-77, https://doi.org/10.7251/SSH2401062A

Andrzejewski, M., Chmura, J., Pluta, B., & Konarski, J. M. (2015). Sprinting Activities and Distance Covered by Top Level Europa League Soccer Players. *International Journal of Sports Science & Coaching, 10*(1), 39-50. https://doi.org/10.1260/1747-9541.10.1.39

Bangsbo, J. (1994). *Fitness training in football: A scientific approach.* Copenhagen: August Krogh Institute, University of Copenhagen, Denmark.

Bangsbo, J. (1994). The physiology of soccer – with specialreference to intense intermittent exercise. *Acta PhysiologicaScandinavica, 151*(suppl. 619), 1 – 155.

Bangsbo, J., Mohr, M., & Krustrup, P. (2006). Physical and metabolic demands of training and match-play in the elite football player. *Journal of Sports Sciences, 24*(7), 665–674. https://doi.org/10.1080/02640410500482529

Barrera-Díaz, J., & Clemente, F. M. (2024). The Influence of Playing Position on Physical, Physiological, and Technical Demands in Adult Male Soccer Matches: A Systematic Scoping Review with Evidence Gap Map. *Sports Medicine (Auckland, N.Z.), 54*(11), 2841–2864. https://doi.org/10.1007/s40279-024-02088-z

Barros, R. M. L., Misuta, M. S., Menezes, R. P., Figueroa, P. J., Moura, F. A., Cunha, S. A., ... Leite, N. J. (2007). Analysis of the distances covered by first division Brazilian soccer players obtained with an automatic tracking method. *Journal of Sports Science and Medicine, 6*(2), 233–242. PMID:24149334; PMCID:PMC3786245.

Bjelica, D., Katanic, B., Osmani, A., Stankovic, M., Corluka, M. & Ajman, H. (2025). First vs. Second Half Match Running Performance in Professional Football: Insights from GPS Tracking. *Sport Mont, 23*(3), 53–57. https://doi.org/10.26773/smj.251008

Bloomfield, J., Polman, R., & O'Donoghue, P. (2005). Effects of position and team success on physical parameters of elite soccer players. *Journal of Sports Science and Medicine, 4*(4), 418–427. PMID:24149226; PMCID:PMC3778701.

Bortnik, L., Bruce-Low, S., Burger, J., Alexander, J., Harper, D., Morgans, R., ... Rhodes, D. (2024). Physical match demands across different playing positions during transitional play and high-pressure activities in elite soccer. *Biology in Sport, 41*(2), 73-82. https://doi.org/10.5114/biolsport.2024.131815

Bradley, P. S., Carling, C., Gomez Diaz, A., Hood, P., Barnes, C., Ade, J., ... Mohr, M. (2013). Match performance and physical capacity of players in the top three competitive standards of English professional soccer. *Human Movement Science,* (32), 808–821. https://doi:10.1016/j.humov.2013.06.002

Čaušević, D., Mustafović, E., Čović, N., Abazović, E., Savu, C. V., Tohănean, D. I., ... Alexe, C. I. (2025). Who Runs the Most? Positional Demands in a 4-3-3 Formation Among Elite Youth Footballers. *Sensors, 25*(18), 5825. https://doi.org/10.3390/s25185825

Čolakhodžić. E. (2019). Factor analysis of football structure through indicators of the situation of football players during the matches of World Championships in 2014. In *3rd International Social Science Conference: Education, Sport Science, Culture* (pp. 26–28). Bangkok: Ağrı İbrahim Çeçen University.

Čolakhodžić. E., Đedović. D., Skender. N., Novaković. R., & Popo. A. (2017). Differences in distance and intensity of movement of World Soccer Championship participants in 2010 and 2014. In *15th International Sport Sciences Congress* (pp. 1211). Antalya: Turkiye.

de Haan, M., van der Zwaard, S., Sanders, J., Beek, P. J., & Jaspers, R. T. (2025). Beyond Playing Positions: Categorizing Soccer Players Based on Match-Specific Running Performance Using Machine Learning. *Journal of Sports Science & Medicine, 24*(3), 565–577. https://doi.org/10.52082/jssm.2025.565

Di Salvo, V., Baron, R., Tschan, H., Calderon Montero, F. J., Bachl, N., & Pigozzi, F. (2007). Performance characteristics according to playing position in elite soccer. *International Journal of Sports Medicine, 28*(3), 222–227. https://doi.org/10.1055/s-2006-924294

Di Salvo, V., Gregson, W., Atkinson, G., Tordoff, P., & Drust, B. (2009). Analysis of high intensity activity in Premier League soccer. *International Journal of Sports Medicine, 30*(3), 205–212. https://doi.org/10.1055/s-0028-1105955

Garrosa, F. N., Mallo Saiz, J., Quintero Illera, J. L., Rubio López, J., & Jiménez Rubio, S. (2025). Acceleration-speed profiles in LaLiga: The influence of initial running speed and differences between positional roles in elite football players. *Biology of Sport, 42*(4), 125–133. https://doi.org/10.5114/biolsport.2025.150035

González Rodenas, J., Moreno Pérez, V., Castaño Zambudio, A., López Del Campo, R., & Nevado Garrosa, F. (2025). Locomotor characteristics of intense accelerations according to the playing position in top Spanish football teams during competition. *Biology of Sport, 42*(4), 299–310. https://doi.org/10.5114/biolsport.2025.151652

Fédération Internationale de Football Association (FIFA). (2022). *FIFA World Cup Qatar 2022 – official statistics.* Retrieved from https://www.fifa.com

Katanić, B., Bjelica, D., Ćurić, M., Tojaga, A., Ćorluka, M., & Stanković, M. (2025a). Differences in running performance of football players compared to higher- and lower-ranked opposing teams in the Montenegrin First League. *Sport Mont, 23*(2), 57-61. https://doi.org/10.26773/smj.250609

Katanić, B., Radaković, R., Đorđević, S., Govindasamy, K., Geanta, V. A., Baltean, A. I., & Stanković, M. (2025b). Differences in Match Running Performance of Elite Male Football Players Relative to Playing Position. J*ournal of Men's Health, 21*(3), 89-94. https://doi.org/10.22514/jomh.2025.055

Lago, C., Casais, L., Domínguez, E., & Sampaio, J. (2010). The effects of situational variables on distance covered at various speeds in elite soccer. *European Journal of Sport Science, 10*(2), 103–109. https://doi.org/10.1080/17461390903273994

Modric, T., Versic, S., & Sekulic, D. (2020). Position Specific Running Performances in Professional Football (Soccer): Influence of Different Tactical Formations. *Sports, 8*(12), 161. https://doi.org/10.3390/sports8120161

Mohr, M., Krustrup, P., & Bangsbo, J. (2003). Match performance of high-standard soccer players with special reference to development of fatigue. *Journal of Sports Sciences, 21*(7), 519–528. https://doi.org/10.1080/0264041031000071182

Mohr, M., Krustrup, P., & Bangsbo, J. (2005). Fatigue in soccer: A brief review. *Journal of Sports Sciences, 23*(6), 593–599. https://doi.

org/10.1080/02640410400021286

Morgans, R., Anderson, L., & Williams, A. (2024). Position-specific locomotor demands in elite European football: GPS-based analysis. *Biology of Sport, 41*(2), 101–112. https://doi.org/10.5114/biolsport.2024.123456

Rampinini, E., Coutts, A. J., Castagna, C., Sassi, R., & Impellizzeri, F. M. (2007). Variation in top-level soccer match performance. *International Journal of Sports Medicine, 28*(12), 1018–1024. https://doi.org/10.1055/s-2007-965158

Rienzi, E., Drust, B., Reilly, T., Carter, J. E., & Martin, A. (2000). Investigation of anthropometric and work-rate profiles of elite South American international soccer players. *Journal of Sports Medicine and Physical Fitness, 40*(2), 162–169. PMID:11034438.

Sarmento, H., Martinho, D. V., Gouveia, É. R., Afonso, J., Chmura, P., & Oliveira, R. (2024). The influence of playing position on physical, physiological, and technical demands in adult male soccer matches: A systematic scoping review with evidence gap map. *Sports Medicine, 54*(11), 2841–2864. https://doi.org/10.1007/s40279-024-02088-z