# Analysis of the influence of opposition level on intensity and contextual variables related to soccer outcomes: a one-year observational study

*Análise da influência do nível de oposição na intensidade e variáveis contextuais relacionadas aos resultados do futebol: um estudo observacional de um ano*


## Authors

Leandro de Lima e Silva [1,2]
Rodrigo Gomes de Souza Vale [1,2]
Yuri Rolim Lopes Silva [1]
Juliano Spineti dos Santos [3]
Eduardo Borba Neves [4]
Vicente Pinheiro Lima [2, 5]
Luciano Alonso Valente dos Santos [6]
Gustavo Casimiro Lopes [2, 7]
Renato Tavares Fonseca [8]
Rodolfo de Alkmim Moreira Nunes [1,2]

[1, 2, 5, 7] State University of Rio de Janeiro (UERJ), Rio de Janeiro, Brazil
[3] Fluminense Football Club, Rio de Janeiro, Brazil
[4] Federal Technological University of Paraná (UTFPR), Curitiba, Brazil
[6] Federal University of Rio de Janeiro (UFRJ), Rio de Janeiro, Brazil
[8] PrevSport, Rio de Janeiro, Brazil

Corresponding author:
Yuri Rolim Lopes Silva
professoryurirolim@gmail.com



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## Abstract

Introduction and Objective. To analyze the influence of contextual factors, focusing on opposition level, on the physical performance of an elite Brazilian team over one year.
Methodology. A total of 54 matches involving 38 players from an elite Brazilian team were analyzed, resulting in 786 performance records collected via GPS during national and international competitions. Fourteen intensity variables and twelve contextual variables were considered. Spearman's correlations were used to examine the associations between intensity variables and performance, controlling for opposition level.
Results. The goal difference was positively correlated with intensity in center-backs ($\rho = 0.721$, $p < 0.001$), full-backs ($\rho = 0.638$, $p < 0.001$), and midfielders ($\rho = 0.863$, $p < 0.001$). The total intensity of forwards was correlated with that of full-backs ($\rho = 0.500$, $p < 0.001$) and total distance covered ($\rho = 0.605$, $p < 0.001$). Mechanical load (PlayerLoad) was correlated with center-back intensity ($\rho = 0.619$, $p < 0.001$) and high-intensity distance ($\rho = 0.921$, $p < 0.001$). Sprint distance was correlated with total intensity ($\rho = 0.591$, $p < 0.001$).
Conclusions. Opposition level was associated with the team's physical demands, requiring greater defensive intensity against strong opponents and yielding better goal difference performance against moderate-level opponents.



## Keywords

Opposition; physical performance; football; contextual factor; global positioning system.



## Resumo

Introdução e Objetivo. Analisar a influência de fatores contextuais, com foco no nível de oposição, no desempenho físico de uma equipe brasileira de elite ao longo de um ano.
Metodologia. Um total de 54 partidas envolvendo 38 jogadores de uma equipe brasileira de elite foram analisadas, resultando em 786 registros de desempenho coletados via GPS durante competições nacionais e internacionais. Quatorze variáveis de intensidade e doze variáveis contextuais foram consideradas. As correlações de Spearman foram usadas para examinar as associações entre variáveis de intensidade e desempenho, controlando o nível de oposição.
Resultados. O saldo de gols foi positivamente correlacionado com a intensidade em zagueiros ($\rho = 0{,}721$, $p < 0{,}001$), laterais ($\rho = 0{,}638$, $p < 0{,}001$) e meio-campistas ($\rho = 0{,}863$, $p < 0{,}001$). A intensidade total dos atacantes foi correlacionada com a dos laterais ($\rho = 0{,}500$, $p < 0{,}001$) e com a distância total percorrida ($\rho = 0{,}605$, $p < 0{,}001$). A carga mecânica (PlayerLoad) foi correlacionada com a intensidade do zagueiro ($\rho = 0{,}619$, $p < 0{,}001$) e a distância de alta intensidade ($\rho = 0{,}921$, $p < 0{,}001$). A distância do sprint foi correlacionada com a intensidade total ($\rho = 0{,}591$, $p < 0{,}001$).
Conclusões. O nível do adversário influenciou as demandas físicas da equipe, exigindo maior intensidade defensiva contra adversários fortes e resultando em melhor desempenho no saldo de gols contra adversários de nível moderado.



## Palavras-chave

Oposição; desempenho físico; futebol; fator contextual; sistema de posicionamento globa

## Introduction

Soccer is an intermittent team sport characterized by high physiological demands (Lima e Silva et al., 2019). The performance of elite athletes is determined not only by their technical and tactical skills but also by their ability to respond to high levels of physical demand (Abbott et al., 2018; Mitrotasios et al., 2022).

The introduction of GPS monitoring has enabled the precise quantification of these demands, particularly regarding distances covered, sprints, and accelerations performed throughout the match. This advancement has contributed to a detailed analysis of physical performance and allowed for data-driven interventions (Aquino et al., 2021; Fahey et al., 2023). These variables are essential for both coaches and sports physiologists seeking to optimize training, prevent injuries, and enhance on-field performance (Vieira et al., 2018).

Contextual factors such as opponent quality, match location, and schedule congestion have been shown to have a substantial influence on game intensity variables (Aquino, Vieira, et al., 2017; Gonçalves et al., 2021). In particular, recent studies indicate that matches against high-level opponents require greater volumes of high-intensity running and more rapid accelerations, as players are forced to cope with increased tactical pressure and higher game demands (Bortnik et al., 2022; Djaoui et al., 2022).

Elite Brazilian team athletes cover significantly greater distances against higher-quality opponents (Aquino et al., 2021), a finding that aligns with studies conducted in European championships (Delaney et al., 2018; Jones et al., 2019). This variation in physical load between matches against opponents of different skill levels also highlights the need to adjust training and recovery strategies according to the opponent's profile (Díez et al., 2021).

Another important factor is the impact of fixture congestion, especially in overloaded schedules such as those observed in Brazilian football, which often includes simultaneous national and international competitions (Aquino et al., 2021; Vieira et al., 2018). This context demands a high level of load and recovery management, as consecutive matches with little rest in between can lead to significant declines in athletes' physical performance and increase the risk of injuries (Djaoui et al., 2022; Silva et al., 2021).

In addition, the alternation between tournaments of different contexts (national and international) imposes varying demands on players, with different playing styles and competition intensities (Abbott et al., 2018; Kalapotharakos et al., 2020). Research indicates that the physical demands during congested match periods directly affect high-intensity performance, particularly in players who repeatedly face high-level matches (Rhodes et al., 2021).

The opponent's level is one of the main modulators of the intensity variables' behavior (Aquino, Munhoz Martins, et al., 2017). More qualified opponents demand more from athletes in terms of sprints and high-intensity activities, which implies the need for more specific recovery and training strategies before and after matches against these teams (Modric et al., 2020). However, despite advancements in understanding these dynamics in European and Asian leagues, and although international studies have advanced, there is still a lack of systematic, season-long analysis in Brazilian elite teams, which justifies this study within a clear theoretical framework of intensity variables over an entire season of a Brazilian team (Jerkovic et al., 2022; Nobari et al., 2021).

Additionally, different tactical formations and playing positions can influence the physical demands placed on players, making individualized analysis essential to optimize training and on-field performance (Bortnik et al., 2022; Díez et al., 2021). Fereday et al. (2020) reported that analyzing worst-case scenarios of locomotor demands, calculated using moving averages, provides a more accurate estimate of the maximum physical demands in football matches and supports better athlete preparation for high-intensity periods.

In recent studies aligned with our scope, Almeida et al. (2025) analyzed situational effects on goal-scoring dynamics across Europe, underscoring how match context shapes outcomes. Complementarily, Chootsungnoen et al. (2025) quantified how modifying game constraints (e.g., number of floaters) alters internal and external load during small-sided games. At the professional level in South America, Velás-

quez-González et al. (2025) examined external load across playing positions while accounting for opponent quality and home advantage. Together, these works motivate our focus on how intensity interacts with influence and opposition level in competitive football.

Based on the theoretical framework and the specific research gap identified for Brazilian football, the present study was guided by the following hypotheses: (H1) higher opposition level would be associated with greater competition intensity; (H2) player or team influence would positively moderate the relationship between opposition level and intensity, resulting in a steeper slope for cases with higher influence; and (H3) contextual factors, such as match venue and phase of play, would explain additional variance beyond the effects of opposition level and influence

This study aimed to examine how competition intensity in an elite Brazilian football team varies with opposition level, accounting for contextual factors such as phase of play, venue, and competition stage, and to assess whether player/team influence moderates this relationship over a full competitive year in both national and international tournaments.

## Method

This observational analytical longitudinal study analyzed 70 matches; however, data from 16 of them were discarded (23% data loss), and the potential impact of this exclusion on results was considered as a limitation due to hardware issues, resulting in a database containing the analysis of 54 matches during national (State Championship, Copa do Brasil, and Brazilian Championship) and international (Copa Sudamericana and Copa Libertadores) competitions in the 2022 season.

### *Participants*

Thirty-eight professional outfield football players from a highly prominent team in both the national and international arenas participated in the analysis (Age: 27.2 ± 4.52 years; body fat percentage: 11.96 ± 4.31). All outfield players who took part in at least one official match during the 2022 season and whose GPS data met quality standards were included. Inclusion criteria were: (i) participation in at least one official match from the competitions considered; (ii) complete and valid GPS data for that match; and (iii) player availability (absence of injury or suspension). Exclusion criteria were: (i) incomplete or invalid GPS data due to hardware malfunction; and (ii) goalkeepers, given their distinct physical demands compared to outfield players.

All matches were monitored using the same GPS device (Vector S7, Catapult Innovations, Melbourne, Australia). Data from all eligible players who participated in the matches, including substitutes who entered the game, were analyzed. This study was approved by the Ethics Committee under the approval number (3.301.869). All procedures were conducted in accordance with the guidelines established by the National Health Council Resolution No. 466/2012 and the Declaration of Helsinki (1996) for research involving human subjects.

Between matches, field players completed a consistent training regimen (3–4 football sessions and 2 strength training sessions in the gym), unless there was a midweek game (2–3 football sessions and 1 strength training session in the gym). Data were collected as part of routine monitoring conducted by the club's medical department, with the players' consent as outlined in their contractual agreements.

### *Procedure*

#### *Instrument*

To monitor player movements during football matches, athletes used 10Hz GPS units (Vector S7 6.5 GHz, Catapult Innovations, Melbourne, Australia). This device has high reliability (ICC 0.85–0.97; Cormier et al., 2023) and was positioned on the upper torso and placed in a vest specifically designed to minimize movement interference. The units were activated following the manufacturer's recommendations immediately before the warm-up preceding the game, and to avoid variation between units, players used the same GPS device throughout the entire season.

After the matches, the data were processed using dedicated software (Catapult OpenField Version 3.1.0) and exported to Excel Spreadsheets (Microsoft Office, Version 365) for further analysis.

Physical Activity Quiz

Fourteen game intensity variables obtained via GPS were considered: 1) Total Team Intensity (Int_total): The calculation of this variable followed a replicable mathematical procedure, step by step initially involved the collection of various intensity metrics, such as distance covered at high intensity, the number of sprints, accelerations, and decelerations performed by each player in each match throughout the year. These intensity averages were then adjusted based on the time each athlete spent on the field.

For each player, the dispersion of intensity variable averages was calculated using the ten-score, a transformation of the z-score on a scale from 0 to 10. The z-score was used to measure the deviation of each variable's mean relative to the overall average of all matches and players in the database. The ten-score transformation allowed for the standardization of intensity data, facilitating comparisons between different matches over time (McGuigan, 2017). The total intensity (int_total) was then obtained through the arithmetic mean of these dispersions calculated for each intensity variable, using the ten-scores as a reference. This calculation method allowed the int_total to reflect an aggregated and adjusted measure of the different intensity demands faced by players throughout the matches, considering both variation and consistency in their performances.

In short, the calculation of Total Team Intensity (Int_total) followed a fully replicable step-by-step procedure:

1. Normalization by exposure time: Each metric was divided by the number of minutes the player spent on the field to obtain per-minute rates.
2. Standardization: Each metric was standardized as a z-score relative to the mean and standard deviation across all players and matches in the dataset.
3. Ten-score transformation: Z-scores were converted to a 0–10 scale to facilitate comparisons between matches and players over time.
4. Player-level Total Intensity: For each player, the arithmetic mean of the 14 ten-scores was calculated to represent their Total Intensity for that match.
5. Team-level Total Intensity: The match-level team value was computed as the time-weighted mean of all player Total Intensities, accounting for both starters and substitutes according to minutes played.

From this, it was possible to calculate the other variables derived from the aforementioned variable: 2) Intensity of players acting as center-backs (Int_DEF); 3) Intensity of players acting as full-backs (Int_LAT); 4) Intensity of players acting as midfielders (Int_MIDD); 5) Intensity of players acting as central forwards (Int_A_REF); 6) Intensity of players acting as wingers (Int_EXT).

The following variables were also measured: 7) Intensity of distance covered (m/min) (Int_dist_Traveled): Measures the total distance covered per minute of play, considering all activities performed during the match; 8) Intensity of distance in sprints (m/min) (Int_dist_sprint): Refers to the total distance covered at sprinting speed (above 25.3 km/h), expressed in meters per minute; 9) Intensity of moderate acceleration + deceleration (m/min) (Int_accel_deceler_MOD): This variable measures the distance covered per minute during accelerations or decelerations exceeding 2 $m/s^2$.

Continuing this line of investigation into the variation of intensity during movements, the following variables were also collected: 10) Intensity of intense acceleration + deceleration (m/min) (Int_accel_decel_INT): Similar to the previous variable, but considering only accelerations or decelerations greater than 3 $m/s^2$; 11) Intensity of multiple intense actions (m/min) (Int_Mult_Actions_INT): Measures the frequency of repeated intense actions, such as three or more consecutive sprints above 19.8 km/h, with a minimum interval of 21 seconds between each action; 12) Intensity of mechanical load (m/min) (Int_Load_mec): Corresponds to PlayerLoad (PL), a metric that accounts for all accelerations performed in any of the three planes (sagittal, anteroposterior, and laterolateral).

To assess very high intensities, the following variables were collected:

13) Intensity of distance at high intensity (m/min) (Int_dist_high_int): Total distance covered above 19.8 km/h, expressed in meters per minute;14) Intensity of explosive efforts (m/min) (Int_exp_effort): Number of actions involving quick direction changes, accelerations or decelerations above 3 $m/s^2$, or vertical jumps higher than 40 cm.

The five contextual variables considered were: 1) Opposition Level: Reflects the quality or relative strength of the opponent based on their final placement in the competition: Low: Weaker opposition; Medium: Moderate difficulty opponent; High: High-quality and challenging opposition; 2) Goals scored (Goals_pro); Goals conceded (Goals_against); 3) Team goal difference in matches, resulting from the subtraction of goals scored and goals conceded (Difference_Goal); 4) Match result (Result_Partida): Loss, draw, or win.

### *Data analysis*

The data were processed using IBM SPSS Statistics 25 and presented as mean, standard deviation, and minimum and maximum values. To assess the normality of the data, skewness and kurtosis tests were used. The Spearman correlation test was applied to analyze associations between the variables of interest because the data distribution of some study variables did not follow a Normal curve. Partial correlation was used, controlling for the opposition level. The variable "opposition level" was used as a control variable in the partial correlation, considering that the level of opposition of opponents can influence the motivation and athletic performance of the team during a soccer match. Levene's test was used to verify the homogeneity of variance of the sample data. One-way ANOVA assumptions were tested (normality via skewness/kurtosis; homogeneity via Levene's test) and then ANOVA with Bonferroni-adjusted post-hoc tests was used to compare study variables according to the opposition level (1- low; 2- medium; 3- high). The partial eta squared (η2) was used, and confidence intervals and effect sizes (Cohen's d) were calculated for main findings according to the following classification: η2<0.01 as no effect; 0.01>= η2<0.06 as a small effect, 0.06>= η2<0.14 as a moderate effect and η2>= 0.14 as a large effect (Cohen, 1988). A p-value of <0.05 was considered statistically significant.

## Results

Table 1 presents the descriptive statistics of the intensity and performance-related variables obtained through GPS devices. The minimum, maximum, mean, standard deviation, skewness, and kurtosis values are reported to provide an overview of the distributions and characteristics of the analyzed data.

Table 1. Descriptive statistics of the intensity-related variables (n=54)

| | Minimum | Maximum | Mean | SD | Skewness | Kurtosis |
|---|---|---|---|---|---|---|
| Goals_pro | 0.00 | 10.00 | 1.79 | 1.73 | 2.164 | 8.465 |
| Goals_ Against | 0.00 | 3.00 | 1.03 | 1.00 | 0.496 | -0.938 |
| Difference_Goal | -3.00 | 9.00 | 0.75 | 1.95 | 1.285 | 4.991 |
| int_total | 3.30 | 9.50 | 5.60 | 1.52 | 0.783 | 0.202 |
| Int_DEF | 2.10 | 10.30 | 5.92 | 1.67 | 0.530 | 0.145 |
| Int_LAT | 2.70 | 9.10 | 5.95 | 1.25 | 0.101 | 0.010 |
| Int_MIDD | 2.70 | 9.00 | 5.81 | 1.30 | 0.493 | 0.383 |
| Int_A_REF | 2.40 | 9.10 | 5.48 | 1.42 | 0.197 | 0.361 |
| Int_EXT | 2.50 | 8.10 | 5.37 | 1.27 | -0.095 | -0.389 |
| Int_dist_Traveled | 95.00 | 119.00 | 106.35 | 5.48 | -0.172 | -0.537 |
| Int_dist_sprint | 0.80 | 2.20 | 1.46 | 0.33 | 0.510 | -0.121 |
| Int_accel_deceler_MOD | 4.80 | 7.30 | 5.76 | 0.48 | 0.568 | 0.545 |
| Int_accel_deceler_INT | 1.00 | 1.90 | 1.19 | 0.15 | 2.393 | 8.812 |
| Int_Mult_Actions_INT | 0.10 | 0.30 | 0.20 | 0.01 | 0.000 | 26.500 |
| Int_Load_mec | 9.50 | 13.00 | 11.04 | 0.71 | -0.073 | 0.416 |
| Int_dist_high_int | 5.00 | 10.50 | 7.57 | 1.35 | 0.250 | -0.397 |
| Int_exp_effort | 0.30 | 0.60 | 0.40 | 0.05 | 1.096 | 3.519 |

Legend: SD: standard deviation; Goals_pro: goals scored by the team; Goals_against: goals conceded; Difference_Goal: goals scored minus goals conceded; Int_total: total intensity of the team; Int_DEF: intensity of players playing as defenders; Int_LAT: intensity of players playing as fullbacks; Int_MIDD: intensity of players playing as midfielders; Int_A_REF: intensity of players playing as center forwards; Int_EXT: intensity of players playing as wingers; Int_dist_Traveled: total distance covered per minute of play; Int_dist_sprint: total distance covered at sprint speed (above 25.3 km/h), expressed in meters per minute; Int_accel_deceler_MOD: amount of meters covered per minute in accelerations or decelerations above 2 $m/s^2$; Int_accel_deceler_INT: considers only accelerations or decelerations above 3 $m/s^2$; Int_Mult_Actions_INT: frequency of repeated intense actions, such as three or more consecutive sprints above 19.8 km/h, with minimum intervals of 21 seconds between each action; Int_Load_mec: corresponds to PlayerLoad (PL), a metric that accounts for all accelerations performed in any of the three planes (sagittal, anteroposterior, and laterolateral); Int_dist_high_int: total distance covered above 19.8 km/h, expressed in meters per minute;

Int_exp_effort: number of actions involving quick direction changes, accelerations or decelerations above 3 m/s$^2$, or vertical jumps higher than 40 cm.

The Spearman correlations presented in Table 2 were conducted to analyze the relationships between intensity variables and distance covered in football with goal difference, goals against, and other performance metrics. The Spearman correlation coefficient was chosen due to some variables not following a normal distribution ( (Goals_pro); (Goals_against); (Difference_Goal); Int_dist_sprint; Int_accel_deceler_INT; Int_Mult_Actions_INT; Int_exp_effort). The results showed a positive correlation ($p < 0.05$) between goal difference and the total number of interventions by the defenders. Furthermore, variables related to intensity, such as accelerations and decelerations, also showed positive correlations ($p < 0.05$) with goal difference and other performance metrics.

Table 2. Spearman Correlation Test Analysis

| | | Goals_pro | Goals_against | Difference_Goal | int_total | Intl_DEF | Intl_LAT | Int_MIDD | Int_A_REF | Int_EXT | Int_dist_Traveled | int_dist_sprint | Int_acel_desacel_MOD | Int_acel_desacel_INT | Int_Mult_Actions_INT | Int_Load_mec | Int_dist_high_int |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Goals_against | ρ | 0.046 | | | | | | | | | | | | | | | |
| | valor-p | 0.742 | | | | | | | | | | | | | | | |
| Difference_Goal | ρ | 0.782 | -0.536 | | | | | | | | | | | | | | |
| | valor-p | 0.000 | 0.000 | | | | | | | | | | | | | | |
| int_total | ρ | -0.039 | -0.001 | 0.007 | | | | | | | | | | | | | |
| | valor-p | 0.781 | 0.994 | 0.958 | | | | | | | | | | | | | |
| Int_DEF | ρ | -.308 | 0.007 | -0.233 | 0.721 | | | | | | | | | | | | |
| | valor-p | 0.023 | 0.960 | 0.090 | 0.000 | | | | | | | | | | | | |
| Int_LAT | ρ | -0.225 | 0.057 | -0.211 | 0.638 | 0.503 | | | | | | | | | | | |
| | valor-p | 0.102 | 0.683 | 0.126 | <0.001 | <0.001 | | | | | | | | | | | |
| Int_MIDD | ρ | 0.146 | -0.069 | 0.200 | 0.863 | 0.525 | 0.450 | | | | | | | | | | |
| | valor-p | 0.292 | 0.618 | 0.148 | <0.001 | <0.001 | 0.001 | | | | | | | | | | |
| Int_A_REF | ρ | 0.036 | -0.344 | 0.246 | 0.554 | 0.462 | 0.287 | 0.458 | | | | | | | | | |
| | valor-p | 0.798 | 0.011 | 0.073 | <0.001 | <0.001 | 0.035 | <0.001 | | | | | | | | | |
| Int_EXT | ρ | 0.071 | 0.056 | 0.025 | 0.776 | 0.395 | 0.518 | 0.645 | 0.404 | | | | | | | | |
| | valor-p | 0.607 | 0.689 | 0.855 | <0.001 | 0.003 | <0.001 | <0.001 | 0.002 | | | | | | | | |
| Int_dist_Traveled | ρ | 0.189 | 0.052 | 0.162 | 0.577 | 0.221 | 0.309 | 0.555 | 0.118 | 0.514 | | | | | | | |
| | valor-p | 0.171 | 0.711 | 0.242 | <0.001 | 0.108 | 0.023 | <0.001 | 0.397 | <0.001 | | | | | | | |
| Int_dist_sprint | ρ | 0.005 | 0.034 | 0.036 | 0.596 | 0.391 | 0.347 | 0.507 | 0.338 | 0.463 | 0.423 | | | | | | |
| | valor-p | 0.969 | 0.807 | 0.797 | <0.001 | 0.003 | 0.010 | <0.001 | 0.013 | <0.001 | 0.001 | | | | | | |
| Int_acel_desacel_MOD | ρ | 0.007 | 0.112 | -0.033 | 0.793 | 0.487 | 0.414 | 0.739 | 0.291 | 0.642 | 0.655 | 0.492 | | | | | |
| | valor-p | 0.962 | 0.422 | 0.815 | <0.001 | <0.001 | 0.002 | <0.001 | 0.033 | <0.001 | <0.001 | <0.001 | | | | | |
| Int_acel_desacel_INT | ρ | -0.174 | 0.130 | -0.214 | 0.667 | 0.529 | 0.426 | 0.490 | 0.331 | 0.608 | 0.167 | 0.318 | 0.640 | | | | |
| | valor-p | 0.208 | 0.349 | 0.120 | <0.001 | <0.001 | 0.001 | <0.001 | 0.014 | 0.000 | 0.227 | 0.019 | <0.001 | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Int_Mult_Actions_INT | ρ | 0.222 | 0.117 | 0.132 | 0.253 | 0.185 | 0.114 | 0.315 | 0.071 | 0.049 | 0.161 | 0.202 | 0.270 | 0.322 | | | |
| | valor-p | 0.106 | 0.400 | 0.340 | 0.064 | 0.180 | 0.410 | 0.020 | 0.609 | 0.722 | 0.245 | 0.143 | 0.049 | 0.018 | | | |
| Int_Load_mec | ρ | 0.205 | 0.035 | 0.189 | 0.619 | 0.215 | 0.335 | 0.587 | 0.230 | 0.512 | 0.921 | 0.497 | 0.662 | 0.188 | 0.136 | | |
| | valor-p | 0.137 | 0.800 | 0.172 | <0.001 | 0.119 | 0.013 | <0.001 | 0.094 | <0.001 | <0.001 | <0.001 | <0.001 | 0.173 | 0.326 | | |
| Int_dist_high_int | ρ | 0.165 | 0.113 | 0.113 | 0.579 | 0.305 | 0.333 | 0.546 | 0.212 | 0.448 | 0.763 | 0.774 | 0.631 | 0.187 | 0.170 | 0.768 | |
| | valor-p | 0.234 | 0.416 | 0.416 | <0.001 | 0.025 | 0.014 | <0.001 | 0.124 | 0.001 | <0.001 | <0.001 | <0.001 | 0.176 | 0.219 | <0.001 | |
| Int_esf_explos | ρ | -0.094 | 0.237 | -0.189 | 0.198 | 0.185 | 0.250 | 0.053 | 0.039 | 0.035 | -0.185 | -0.060 | 0.091 | 0.375 | 0.219 | -0.245 | -0.163 |
| | valor-p | 0.499 | 0.085 | 0.171 | 0.150 | 0.179 | 0.069 | 0.702 | 0.780 | 0.799 | 0.181 | 0.664 | 0.511 | 0.005 | 0.112 | 0.075 | 0.238 |

Legend: Goals_against: goals conceded; Difference_Goal: goals scored minus goals conceded; Int_total: total team intensity; Int_DEF: intensity of players who play as defenders; Int_LAT: intensity of players who play as fullbacks; Int_MIDD: intensity of players who play as midfielders; Int_A_REF: intensity of players who play as a central forward; Int_EXT: intensity of players who play as wingers; Int_dist_Traveled: total distance covered per minute of play; Int_dist_sprint: total distance covered at sprint speed (above 25.3 km/h), expressed in meters per minute; Int_accel_deceler_MOD: amount of meters covered per minute in accelerations or decelerations above 2 m/s$^2$; Int_accel_deceler_INT: considers only accelerations or decelerations above 3 m/s$^2$; Int_Mult_Actions_INT: frequency of repeated intense actions, such as three or more consecutive sprints above 19.8 km/h, with minimum intervals of 21 seconds between each action; Int_Load_mec: corresponds to PlayerLoad (PL), a metric that considers all accelerations performed in any of the three planes (sagittal, anteroposterior, and laterolateral); Int_dist_high_int: total distance covered above 19.8 km/h, expressed in meters per minute; Int_exp_effort: number of actions involving quick changes of direction, accelerations or decelerations above 3 m/s$^2$, or vertical jumps higher than 40 cm.

The results from Table 2 showed correlations ($p < 0.05$) between several analyzed variables. The variable Difference_Goal exhibited a positive correlation with the variable Goals_pro and a negative correlation with the variable Goals_against.

The variable Int_total correlated positively with the variable Int_DEF; the variable Int_LAT correlated positively with the variable Int_DEF; the variable Int_MIDD showed positive correlations with the variables Int_total, Int_DEF, and Int_LAT.

The variable Int_A_REF correlated positively with the variable Int_total; the variable Int_EXT showed positive correlations with the variables Int_total, Int_LAT, and Int_MIDD.

The variable Int_dist_Traveled correlated positively with the variables Int_total, Int_MIDD, and Int_EXT.

The variable Int_dist_sprint showed positive correlations with the variables Int_total, Int_DEF, and Int_LAT, indicating that greater distance covered in sprints is associated with higher total intensity, as well as with the intensity of defenders and fullbacks.

The variable Int_accel_deceler_MOD correlated positively with the variable Int_total. The variable Int_accel_deceler_INT also showed a positive correlation with the variable Int_total.

The variable Int_Mult_Actions_INT correlated positively with the variable Int_accel_deceler_INT. The variable Int_Load_mec showed positive correlations with the variables Int_total and Int_dist_Traveled.

The variable Int_dist_high_int correlated positively with the variables Int_total and Int_accel_deceler_MOD.

The partial correlations are presented in Table 3 below, to analyze the relationships between intensity variables and distance covered in football with goal difference, goals conceded, and other performance metrics, controlled for the variable 'Opposition Level'.

Table 3. Partial Correlation with Opposition Level as the Control Variable

| | | Goals_pro | Goals_against | Difference_Goal | int_total | Int_DEF | Int_LAT | Int_MIDD | Int_A_REF | Int_EXT | int_dist_Traveled | int_dist_sprint | int_accel_desacel_MOD | int_accel_desacel_INT | int_Mult_Actions_INT | int_Load_mec | int_dist_high_int |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Goals_against | r | 0.056 | | | | | | | | | | | | | | | |
| | valor-p | 0.692 | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Difference_Goal | r | 0.857 | -0.466 | | | | | | | | | | | | | |
| | valor-p | <0.001 | <0.001 | | | | | | | | | | | | | |
| int_total | r | 0.163 | -0.005 | 0.147 | | | | | | | | | | | | |
| | valor-p | 0.242 | 0.974 | 0.293 | | | | | | | | | | | | |
| Int_DEF | r | -0.049 | 0.011 | -0.049 | 0.800 | | | | | | | | | | | |
| | valor-p | 0.726 | 0.938 | 0.725 | <0.001 | | | | | | | | | | | |
| Int_LAT | r | -0.074 | 0.049 | -0.091 | 0.661 | 0.533 | | | | | | | | | | |
| | valor-p | 0.599 | 0.726 | 0.518 | <0.001 | <0.001 | | | | | | | | | | |
| Int_MIDD | r | 0.309 | -0.063 | 0.306 | 0.844 | 0.549 | 0.445 | | | | | | | | | |
| | valor-p | 0.024 | 0.653 | 0.026 | <0.001 | <0.001 | 0.001 | | | | | | | | | |
| Int_A_REF | r | 0.090 | -0.331 | 0.251 | 0.605 | 0.500 | 0.330 | 0.432 | | | | | | | | |
| | valor-p | 0.520 | 0.015 | 0.070 | <0.001 | <0.001 | 0.016 | 0.001 | | | | | | | | |
| Int_EXT | r | 0.101 | 0.002 | 0.088 | 0.726 | 0.399 | 0.533 | 0.570 | 0.427 | | | | | | | |
| | valor-p | 0.471 | 0.988 | 0.529 | <0.001 | 0.003 | <0.001 | <0.001 | 0.001 | | | | | | | |
| Int_dist_Traveled | r | 0.229 | 0.050 | 0.177 | 0.522 | 0.222 | 0.243 | 0.478 | 0.062 | 0.470 | | | | | | |
| | valor-p | 0.098 | 0.722 | 0.204 | <0.001 | 0.110 | 0.079 | <0.001 | 0.661 | <0.001 | | | | | | |
| Int_dist_sprint | r | 0.061 | 0.015 | 0.046 | 0.591 | 0.381 | 0.413 | 0.480 | 0.379 | 0.545 | 0.409 | | | | | |
| | valor-p | 0.664 | 0.913 | 0.743 | <0.001 | 0.005 | 0.002 | 0<0.001 | 0.005 | <0.001 | 0.002 | | | | | |
| Int_acel_desacel_MOD | r | 0.127 | 0.081 | 0.070 | 0.775 | 0.569 | 0.421 | 0.684 | 0.320 | 0.611 | 0.626 | 0.466 | | | | |
| | valor-p | 0.367 | 0.565 | 0.616 | <0.001 | <0.001 | 0.002 | 0<0.001 | 0.019 | <0.001 | <0.001 | <0.001 | | | | |
| Int_acel_desacel_INT | r | -0.004 | 0.027 | -0.018 | 0.582 | 0.531 | 0.364 | 0.461 | 0.307 | 0.444 | 0.175 | 0.266 | 0.716 | | | |
| | valor-p | 0.976 | 0.848 | 0.900 | <0.001 | <0.001 | 0.007 | 0.001 | 0.025 | 0.001 | 0.210 | 0.054 | <0.001 | | | |
| Int_Mult_Actions_INT | r | 0.506 | 0.096 | 0.398 | 0.317 | 0.244 | 0.109 | 0.380 | 0.116 | 0.048 | 0.124 | 0.148 | 0.289 | 0.354 | | |
| | valor-p | <0.001 | 0.492 | 0.003 | 0.021 | 0.078 | 0.439 | 0.005 | 0.410 | 0.735 | 0.376 | 0.291 | 0.036 | 0.009 | | |
| Int_Load_mec | r | 0.247 | 0.012 | 0.213 | 0.535 | 0.228 | 0.213 | 0.517 | 0.116 | 0.461 | 0.921 | 0.418 | 0.605 | 0.177 | 0.068 | |
| | valor-p | 0.074 | 0.930 | 0.126 | <0.001 | 0.101 | 0.125 | <0.001 | 0.408 | 0.001 | 0.000 | 0.002 | <0.001 | 0.206 | 0.629 | |
| Int_dist_high_int | r | 0.164 | 0.091 | 0.098 | 0.589 | 0.340 | 0.352 | 0.483 | 0.270 | 0.510 | 0.752 | 0.806 | 0.593 | 0.175 | 0.165 | 0.717 |
| | valor-p | 0.242 | 0.516 | 0.485 | <0.001 | 0.013 | 0.010 | 0<0.001 | 0.051 | <0.001 | <0.001 | <0.001 | <0.001 | 0.211 | 0.237 | <0.001 |
| Int_esf_explos | r | 0.171 | 0.209 | 0.043 | 0.256 | 0.278 | 0.252 | 0.129 | 0.111 | -0.019 | -0.179 | -0.053 | 0.071 | 0.116 | 0.330 | -0.219 | -0.106 |
| | valor-p | 0.222 | 0.133 | 0.758 | 0.064 | 0.044 | 0.069 | 0.359 | 0.429 | 0.890 | 0.201 | 0.707 | 0.613 | 0.408 | 0.016 | 0.115 | 0.449 |

Legend: Goals_against: goals conceded; Difference_Goal: goals scored minus goals conceded; Int_total: total team intensity; Int_DEF: intensity of players acting as defenders; Int_LAT: intensity of players acting as fullbacks; Int_MIDD: intensity of players acting as midfielders; Int_A_REF: intensity of players acting as a center forward; Int_EXT: intensity of players acting on the wings as wingers; Int_dist_Traveled: total distance covered per minute of play; Int_dist_sprint: distance covered at sprint speed (above 25.3 km/h), expressed in meters per minute; Int_accel_deceler_MOD amount of meters covered per minute in accelerations or decelerations above 2 $m/s^2$; Int_accel_deceler_INT: considers only accelerations or decelerations above 3 $m/s^2$; Int_Mult_Actions_INT: frequency of repeated intense actions, such as three or more consecutive sprints above 19.8 km/h, with minimum intervals of 21 seconds between each action; Int_Load_mec: a metric that considers all accelerations performed in any of the three planes (sagittal, anteroposterior, and laterolateral); Int_dist_high_int: total distance covered above 19.8 km/h, expressed in meters per minute; Int_exp_effort: number of actions involving quick changes of direction, accelerations or decelerations above 3 $m/s^2$, or vertical jumps higher than 40 cm.

The results of the partial correlation test presented in Table 3, considering the level of opposition as a control variable, revealed associations ($p < 0.05$) that deserve to be highlighted. The goal difference (Difference_Goal) was positively correlated with the number of goals scored (Goals_pro) and negatively with the goals conceded (Goals_against). Furthermore, the intensity of midfielders (Int_MIDD) showed a positive correlation with the total intensity (Int_total). This finding was also observed for the intensity of defenders (Int_DEF) and fullbacks (Int_LAT), indicating a positive interaction between the intensity of these positions.

The intensity of reference attackers (Int_A_REF) also showed a positive correlation with the total intensity (Int_total). Similarly, the intensity of wingers (Int_EXT) was positively correlated with the total intensity, as well as with the intensity of fullbacks (Int_LAT) and midfielders (Int_MIDD).

The distance covered (Int_dist_Traveled) was also positively correlated with the total intensity, as well as with the intensity of midfielders and wingers. Additionally, the distance covered in sprints (Int_dist_sprint) showed a positive correlation with the total intensity, as well as with the intensity of defenders and fullbacks.

The intensity in moderate accelerations and decelerations (Int_accel_deceler_MOD) was also positively correlated with the total intensity, indicating that the increase in these moderate actions is directly related to the team's intensity level. The intensity in intense accelerations and decelerations (Int_accel_deceler_INT) followed the same trend, presenting a positive correlation with the total intensity, reinforcing the importance of high-intensity actions in the team's overall performance.

Moreover, multiple intense actions (Int_Mult_Actions_INT) correlated positively with intense accelerations and decelerations, highlighting that the performance of multiple intense actions is associated with a higher intensity in these game dynamics. The mechanical load (Int_Load_mec) also showed a positive correlation with the total intensity and the distance covered.

The distance covered at high intensity (Int_dist_high_int) was positively correlated with the total intensity and with moderate accelerations and decelerations.

The One-Way ANOVA revealed an interaction between the variables match result ($F = 11.905$, $p < 0.001$, Power = 99%), goals scored ($F = 5.572$, $p = 0.006$, Power = 84%), goal differences ($F = 6.151$, $p = 0.004$, Power = 87%), and intensity of accelerations and decelerations ($F = 11.155$, $p < 0.001$, Power = 99%) when compared by opposition level. The power of experiment was calculated and showed that the sample size was sufficient to detect a true statistical effect in the study. The other variables analyzed did not show significant effects regarding the opposition level. The variables that showed significant influence from the opposition level are detailed in Table 4, with comparisons conducted using the adjusted Bonferroni post-hoc test.

Table 4 presents the results of the multiple comparisons between the different levels of opposition (low, medium, and high).

The variables with significant differences were: Result_Partida, Goals_pro, Difference_Goal, and Int_accel_deceler_INT with an eta squared ($\eta 2$) of 0.32, 0.18, 0.19 and 0.30, respectively, classified as a large effect.

Table 4. Multiple Comparisons According to Opponent Level in Variables with Significant Influence (One-Way ANOVA with Bonferroni-adjusted post hoc).

| Variable | Comparison between groups | Difference between groups | p-value |
|---|---|---|---|
| Result_Partida | 1 < 2 | -0.949* | 0.001 |
| | 2 > 3 | 0.899* | 0.002 |
| Goals_pro | 1 < 2 | -1.535* | 0.024 |
| Difference_Goal | 1 < 2 | -1.684* | 0.027 |
| | 2 > 3 | 1.856* | 0.023 |
| Int_accel_deceler_INT | 1 < 3 | -0.223* | 0.001 |
| | 2 < 3 | -0.222* | 0.000 |

Legend: Result_Partida: match result (loss, draw, or win); Goals_pro: goals scored by the team; Difference_Goal: goals scored minus goals conceded; Int_accel_deceler_INT: intensity of acceleration and deceleration; Groups: Low Opponent Level = 1; Medium Opponent Level = 2; High Opponent Level = 3; * = significant result from the Bonferroni-adjusted post hoc ($p<0.05$).

The results presented in Table 4 indicate that the team studied, in the match result (Result_Partida) variable, performed better ($p < 0.05$) against opponents of medium level than against opponents of low and high levels.

For the goals scored variable, the team scored fewer goals against medium-level opponents than against low-level opponents ($p < 0.05$). The goal difference was also lower against medium-level opponents compared to low-level opponents ($p < 0.05$), but it was higher against high-level opponents compared to medium-level opponents ($p < 0.05$).

The intensity of intense accelerations and decelerations (Int_accel_deceler_INT) was lower against high-level opponents compared to both low-level ($p < 0.05$) and medium-level ($p < 0.05$) opponents.

## Discussion

The results of this study reinforce the importance of monitoring intensity variables and distance covered for performance in soccer, supporting previous findings in the literature (Abbott et al., 2018; Aquino et al., 2020; Gonçalves et al., 2021). The positive correlation between Difference_Goal and the variables Goals_pro and Goals_against indicates that a greater goal difference is associated with a higher number of goals scored and a lower number of goals conceded. This finding is crucial for demonstrating the relationship between offensive effectiveness and defensive solidity, confirming previous studies on the impact of these metrics on team success (Aquino et al., 2020).

The positive correlation between Int_total and Int_DEF suggests that a higher total intensity level is associated with greater intensity from defenders. This result aligns with the findings of Aquino et al. (2020), who demonstrated that the physical demands of defenders are critical for team performance, especially in high-intensity matches and against higher-quality opponents.

The intensity of full-backs Int_LAT was also positively correlated with Int_DEF, suggesting an interdependence in the physical demands between these two positions. This is in line with the study by Abbott et al. (2018), which showed that physical demands vary by position, but there is a strong connection between the actions of defensive players in terms of physical intensity.

The intensity of midfielders Int_MIDD showed positive correlations with Int_total, Int_DEF, and Int_LAT. This indicates that greater intensity from midfielders is associated with higher total intensity and greater intensity from defenders and full-backs, suggesting that these players play a crucial role in balancing both defense and attack. Previous studies (Aquino et al., 2021; Delaney et al., 2018) have indicated that the midfield plays a key role in transitional moments, especially in ball recovery and redistribution actions, which corroborates the findings of correlations between these positions.

In relation to Int_A_REF (reference attackers), the positive correlation with Int_total highlights that the intensity of attackers is also a significant factor in the overall team performance, as observed by Gonçalves et al. (2021). This finding reinforces that attacking players, especially reference attackers, need to maintain a high level of intensity to maximize their chances of success in offensive situations.

The positive correlations between the intensity of the Int_EXT (wingers), Int_total, Int_LAT (full-backs), and Int_MIDD (midfielders) suggest that wingers, who occupy more advanced areas of the field, also play a critical role in maintaining a high overall intensity. Bortnik et al. (2022) reported that these players are often required to perform high-intensity actions, both defensively and offensively, supporting these results.

The Int_dist_Traveled (distance covered) positively correlated with Int_total as well as the intensity of midfielders and wingers, indicating that players in more central and lateral positions contribute significantly to the team's total effort. In this regard, Diez et al. (2021) showed that the distance covered, especially at high intensity, is a critical factor for the success of teams facing stronger opponents.

Additionally, the Int_dist_sprint (sprint distance) was positively correlated with Int_total, Int_DEF (defenders), and Int_LAT, highlighting that high-intensity actions like sprints are crucial for defensive success. This finding aligns with the conclusions of Djaoui et al. (2022), who emphasized the importance of sprints in critical moments of quick transitions in soccer.

The variables related to accelerations and decelerations, both moderate Int_accel_deceler_MOD and intense Int_accel_deceler_INT, presented positive correlations with Int_total in the present study. These findings underscore the importance of repetitive and high-intensity actions, especially in decisive moments such as offensive and defensive transitions (Delaney et al., 2018). The ability to perform multiple intense actions in short periods is linked to the success of both defensive and offensive players in high-level matches (Djaoui et al., 2022).

Another correlation found in this study was between Int_Load_mec (mechanical load) and Int_total and Int_dist_Traveled. This indicates that the physical load on players increases as intensity demands rise, particularly in matches against stronger opponents (Gonçalves et al., 2021). This increase in physical demands is particularly evident for players who perform a higher number of sprints and high-intensity actions, such as full-backs and wingers, as described in studies on the impact of opponent level on physical demands by Kalapotharakos et al. (2020) and Modric et al. (2020).

In relation to the partial correlation, controlling for the opposition level (Table 3), the results of this study demonstrate a relationship between Difference_Goal and the number of Goals_pro and Goals_against, suggesting that both offensive and defensive performance are directly related to the team's success. This finding is consistent with Aquino et al. (2021), who observed the importance of solid defense for team success, while the ability to score more goals contributes to a higher Difference_Goal.

Furthermore, a positive correlation was identified between the Int_MIDD and the int_total of the team. This relationship reinforces the relevance of midfield players in managing the team's overall physical demands, as demonstrated by Aquino et al. (2020), who highlighted the crucial role of these players in both offensive and defensive transitions. The contributions of the Int_DEF and Int_LAT also corroborate the findings of Abbott et al. (2018), who emphasized the impact of these positions in maintaining game intensity in high physical demand situations.

The Int_A_REF and the Int_EXT was positively correlated with the total intensity of the team, highlighting the importance of these players in offensive strategies. Bortnik et al. (2022) pointed out that the ability of wingers to cover long distances and perform high-intensity sprints is essential to breaking down opposing defenses.

Moreover, the distance covered by the wingers (Int_dist_Traveled) and the Int_LAT showed a synergy in increasing the physical demands of the team as a whole, suggesting that greater participation by the wingers increases the overall intensity of the team, as well as the specific intensity of the full-backs and midfielders, emphasizing the crucial role of full-backs in offensive success. This behavior of wingers and reference forwards also aligns with the observations of Modric et al. (2020), who highlighted how the active involvement of players in the extremes of the field contributes to the team's overall intensity, especially during critical moments of transition.

The Int_accel_deceler_MOD and Int_accel_deceler_INT were positively correlated with the total intensity, suggesting that repetitive high-intensity actions are important for overall performance. These findings are consistent with Delaney et al. (2018), who demonstrated the importance of these actions in decisive phases of the game, such as quick transitions and ball recoveries. Additionally, the Int_Load_mec was positively correlated with total intensity and distance covered, suggesting that the increase in physical demands, especially in games against high-level opponents, is related to higher intensity. Gonçalves et al. (2021) pointed out that as the level of opposition increases, physical demands such as sprints and high-intensity movements also grow, confirming the need for specific training strategies for different opponent levels.

The results of the test for the effect of opposition level on the behavior of the analyzed variables (Table 4) indicated that the opposition level had a significant impact on the Result_Partida variable, reinforcing the importance of considering the quality of the opponent in the team's performance. This finding aligns with the study by Aquino et al. (2021), which observed performance variations in teams according to the opposition level.

It was observed that the team performed better in terms of results and goals against medium-level teams (Group 2). The significant difference between the groups suggests that, against medium-level teams, the team was able to achieve more wins and score more goals, as evidenced by the Result_Partida and Goals_pro ($p<0.05$). This finding corroborates the study by Aquino et al. (2021) which indicates that the opposition level can influence tactical behavior and game intensity. The team in the present study seems to have adopted a more efficient strategy against medium-level opponents, possibly balancing offensive and defensive capabilities more effectively, resulting in a higher Difference_Goal compared to high-level teams ($p<0.05$). On the other hand, against weaker teams (Group 1), there was a tendency for "relaxation" or underestimation of the opponent, which may have reduced offensive and defensive efficiency. This behavior has been previously observed by Djaoui et al. (2022), who pointed out that the perception of a weaker opponent may negatively influence the intensity and focus of athletes.

Against high-level teams (Group 3), the team in the present study increased its Int_accel_deceler_INT ($p<0.05$), which is in accordance with the findings of Delaney et al. (2018), who highlighted how players tend to increase physical intensity against more challenging opponents. The studies by Djaoui et al. (2022) and Silva et al. (2021) pointed to this increase in physical demands in scenarios of more intense opposition, indicating that games against higher-quality opponents result in a greater number of intense accelerations and decelerations. However, this increase in physical intensity did not always result in better outcomes (association only, not causation), as demonstrated by the lack of significant difference in the number of goals scored against high-level teams. This may be attributed to the technical and tactical superiority of the opponents, a conclusion similar to that found by Aquino et al. (2017). This result corroborates the research by Aquino et al. (2020), which indicated a relationship between defensive performance and Difference_Goal in encounters with higher-quality opponents.

The limitations of this study include: restriction to a single elite team, 23% data loss, observational and correlational design (no causal inference), GPS variable validity concerns, and absence of environmental/recovery factors, which may limit the generalization of the results to other teams and competitive contexts. Additionally, the study design is observational and correlational, which prevents any causal inferences. The analysis was based on GPS data, which, while providing detailed information about the athletes' physical behavior, does not capture technical, tactical, or psychological aspects that may also influence performance. Another factor to consider is the absence of variables related to environmental conditions and recovery between matches, which may have been associated with the observed performance responses. Therefore, the results of the present study should be interpreted with caution.

## Conclusions

In summary, the present study revealed associations (not causation) indicating that the team's performance is associated with the level of opposition, with important implications for strategy and physical preparation. The results highlight that the team performed better, in terms of results and goals scored, against medium-level opponents compared to low and high-level ones. This suggests that the team may have adjusted its strategies or intensified its physical effort in response to this specific level of competition, tending to reduce its momentum against weaker opponents. Against stronger opponents, despite increasing physical intensity, the team was unable to convert this greater effort into positive results, confirming the correlation between the level of opposition and performance variables.

Furthermore, the analysis of intensity variables indicates that matches against high-level opponents require greater physical intensity, evidenced by differences in intense accelerations and decelerations. The correlation between physical intensity and the level of opposition suggests the team's adaptation to the higher physical demand when facing higher-quality opponents. In contrast, the increase in intensity in games against low-level teams was less pronounced, which may be associated with a more conservative approach or specific tactical strategies for these matchups. Thus, findings suggest associations that may inform future training hypotheses, but direct recommendations should be considered speculative, and physical preparation should be tailored according to the level of opposition. This could optimize performance by tailoring efforts to the demands imposed by opponents of different levels.

It is recommended that future studies investigate other contextual variables, such as match location (home or away) and its impact on performance. Additionally, it would be relevant to analyze how psychological strategies may influence the variation in intensity in response to the level of opponents.

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## Authors' and translators' details:


| | | |
|---|---|---|
| Leandro de Lima e Silva | l.limaesilva@gmail.com | Author |
| Rodrigo Gomes de Souza Vale | rodrigogsvale@gmail.com | Author |
| Yuri Rolim Lopes Silva | professoryurirolim@gmail.com | Author |
| Juliano Spineti dos Santos | juliano.spineti@hotmail.com | Author |
| Eduardo Borba Neves | neveseb@gmail.com | Author |
| Vicente Pinheiro Lima | professorvicentelima@gmail.com | Author |
| Luciano Alonso Valente dos Santos | mailto:alonso.lvs@gmail.com | Author |
| Renato Tavares Fonseca | renatosmedc@gmail.com | Author |
| Gustavo Casimiro Lopes | gustavo.casimiro@gmail.com | Author |
| Rodolfo de Alkmim Moreira Nunes | rodolfoalkmim@gmail.com | Author |
| Tiago de Freitas Damasceno da Rocha | tiagofdr@gmail.com | Translator |