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ORIGINAL

COVID-19 EFFECTS IN EXTERNAL LOAD IN HIGH LEVEL FOOTBALL

EFFECTS OF COVID-19 ON THE EXTERNAL BURDEN ON HIGH-LEVEL FOOTBALL

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ABSTRACT

We analyzed the effect of the cessation of competition for COVID-19 on the physical performance of soccer players in the 1st Spanish division). The sample was stratified into three groups: 1st-3rd rounds; 25th-27th and 28th-30th. Pairwise comparisons were Student-t and Mann-Whitney U. We used a p-value of ≤0.05 as the criterion for statistical significance. Threshold values for evaluating effect size magnitudes were made using (Cohen's d). After the break, the distances traveled increased for the local and visiting teams. There was a slight decrease in high intensity efforts between post-confinement and the days (25th-27th). Comparing the 1st and 3rd period, values were slightly higher (rounds 28-30). The same was observed in those of accelerations and decelerations, with greater differences between the periods (1st and 3rd). There were differences when the resumption was compared with the days before the break.

KEYWORDS: Covid 19, Football, High performance, Physical parameters.

RESUMEN

Analizamos el efecto del cese de la competición por COVID-19 en el rendimiento físico de jugadores de fútbol de la 1ª división española). La muestra se estratificó en tres grupos: rondas 1ª-3ª; 25ª-27ª y 28ª-30ª. Las comparaciones por pares fueron Student-t y Mann-Whitney U. Usamos un valor p de ≤0.05 como criterio para la significación estadística. Los valores de umbral para evaluar las magnitudes del tamaño del efecto se realizaron a través (d de Cohen). Tras el parón, las distancias recorridas aumentaron en los equipos locales y visitantes. Hubo un ligero descenso de los esfuerzos de alta intensidad entre el post-confinamiento y las jornadas (25ª-27ª). Comparados el 1er y 3er periodo, los valores fueron ligeramente superiores (rondas 28ª-30ª). Eso mismo se observó en las de aceleraciones y desaceleraciones, con mayores diferencias entre los periodos (1º y 3º). Hubo diferencias, cuando se comparó la reanudación con las jornadas previas al parón.

PALABRAS CLAVE: Covid-19, Fútbol, Alto Rendimiento, Parámetros Físicos.

INTRODUCTION

In the second half of 2019, a novel coronavirus (2019-nCov) was detected in China. This virus was named *Severe Acute Respiratory Syndrome* Coronavirus-2 (SARS-CoV-2) by the International Committee on Taxonomy of Viruses (ICTV) (Rodríguez-Morales, et al., 2020). Already on December 30, 2019, the Chinese ophthalmologist Li Wenliang had detected in the city of Wuhan (Hubei - People's Republic of China) seven cases of a virus that resembled Severe Acute Respiratory Syndrome (SARS) that could cause an epidemiological situation like that of 2003 (Green, 2020; Parrish et al., 2020). The World Health Organization (WHO) declared the new disease (Coronavirus 2019 - COVID-19) as a pandemic on March 11, 2020 (WHO 2020). The pandemic is affecting life globally, forcing millions of people around the world to alter their routines and forcing them to seclude themselves for long periods of time affecting their quality of life (Hammami et al., 2020) and altering, sometimes significantly, their functional, physical, psychological, and cognitive abilities (Chen, et al., 2020).

Although the regular practice of exercise and sport is a factor to be included as a protective measure against the disease and its potential consequences, strengthening the immune system and reducing the associated risk factors (respiratory, cardiovascular and metabolic diseases, including obesity and its complications), the reality is that its practice has been significantly reduced, among other reasons, by the measures of confinement (Lippi et al., 2020; Fitzgerald et al., 2020). Among the numerous recommendations made by institutions and experts in this type of situation are always practices to stay active at home, with activities that can help counteract the harmful effects of the confinement by COVID-19 (Hammami et al., 2020; Paoliet al., 2020; García-Tascón et al., 2021).

Professional athletes and major sporting events to play in 2020 have also suffered the enormous consequences of the pandemic on all continents (Davis, 2020; Lunch and Orchards, 2021). For example, the XXXII *Olympic Summer Games,* which should have been held in Tokyo 2020 from July 24 to August 9, 2020, were postponeduntil 2021. This postponement comes 122 days before the Opening Ceremony after a joint statement by the International Olympic Committee and the Organizing Committee for the information provided by the World Health Organization, In the same situation were involveds the rest of sports competitions in the rest of the world (NBA, MLB, Wimbledon, Ski World Cup, MotoGP, Formula 1, European Weightlifting Championships, World Indoor Athletics Championships, World Half Marathon, Giro d'Italia, etc.).

Also, as it could not be otherwise, all the major continental competitions (Champions League, Euroleague, Copa America, etc.) and the different National Leagues and Competitions (Premier, Bundesliga, Ligue 1, Serie A, etc.) of professional football were suspended. The National Professional Football League and the Royal Spanish Football Federation agreed, on March 23, 2020, the suspension and postponement of professional football competitions coinciding with the end of the 27th day of the competition. The Spanish First Division League had never seen its calendar altered until the current season and was only suspended during the Spanish Civil War (1936–1939). In the current season the competition resumed, behind closed doors, on June 11. Such a prolonged stop in the middle of the competition undoubtedly affects the performance of the teams and the physical condition of the players, possibly increasing the risk of injury and modifying the development of the game. During the confinement, coaches and players looked for alternative solutions to maintain the level of the players to date that could be incorporated into training (Impellizzeri et al., 2020). Sharing information is likely to be more helpful than providing generic training recommendations on returning to play after covid-19 home confinement. In team sports it is very important to carry out an individual control of the training loads to assess the training stimulus, since an excessive stimulus increases the risk of suffering an injury and an insufficient one decreases performance (Benítez-Jiménez; Falces-Prieto; & García-Ramos, 2020).

In a first stage, the players were forced to train via online in their homes, doing what their coaches proposed, depending on their availability. In a second stage, players began training in small groups limiting physical contact for safety reasons (Mohr et al., 2020; Eirale et al., 2020). To support the work of the technicians, the LFP (Professional Football League, 2020) published guidelines on how the resumption of training should be done to minimize the possible negative effects of the break. Individualized non-face-to-face training is common in individual and collective sports, especially in those more dependent on conditional support (Jiménez-Barreto; & Borges, 2021).

OBJECTIVES

The objective of this study is to see how the break caused by the COVID-19 pandemic affects the performance of players and teams when the competition resumes. To do this, physical variables observed in all teams during the first three days after the resumption of the competition (Days 28th, 29th and 30th), and will be compared with the first three Days of the start of the League (1st, 2nd and 3rd) and the three Days prior to the break (25th, 26th and 27th). It should be borne in mind that the competition system undergoes some modifications that may influence the results observed. They highlight the number of changes that can be made during the match (5 changes per team), the incorporation of a break, never exceeding one minute for each of the two periods in each match of the match (minutes 30 and 75) and the possibility of having to play three games every seven days.

METHOD

SAMPLE

We analyzed 90 matches (N=90) held during the 2019-20 season of La Liga *Santander,* attached to the Professional Football League (LFP) in its 89th edition. For the study, nine days were considered: 1st-3rd, corresponding to the beginning of the competition, 25th-27th, just before COVID-19 and 28th-30th, coinciding with the days played after the return to competition (post COVID-19). On each day all the players were observed aligned with a range ranging between 11 and 14 in the first days (1st-3rd and 25th-27th) and between 11 and 16 in the 28th-30th days.

VARIABLES ANALYZED

Quantitative data were recorded of the technical-tactical variables: total distances traveled, and distances traveled with possession of the ball and without possession of the ball, high intensity routes: sprints and average speed and accelerations and decelerations. The data has been collected through the Global Positioning System (GPS), showing the cumulative total of all participating players for each of the teams. Access to the data has been through the Mediacoach system, which is a system of series of 4K-HDR cameras based on a positional system (Tracab—ChyronHego VID) that records from different angles and analyzes the position of the X and Y coordinates for each player.

STATISTICAL PROCESSING

Statistical analysis was performed using IBM SPSS software version 20.0. The sample was stratified into three groups: rounds 1st-3rd; rounds 25th-27th and rounds 28th-30th. All experimental data are presented as means ± standard deviation (SD). For the calculation of normality, the Kolmogorov Smirnov and Shapiro-Wilks tests and the Levene test were used to analyze the homogeneity of the variations. The peer comparisons we chose to use were Student-t and Mann-Whitney U. A p-value of ≤0.05 was used as a criterion for statistical significance. The threshold values for assessing effect size magnitudes (Cohen's d) were 0.20, 0.60, 1.2, and 2.0 for small, moderate, large, and very large, respectively.

To verify the existence of significant differences between the days taken for the study in the different variables, the unifactorial ANOVA technique was used.

RESULTS

DISTANCES TRAVELED

After the lockdown, the total distance covered by the teams increased (2.03%; p=0.019; ES: 0.435). This increase occurred in a similar way in both phases of thematch. 1st part and 2nd part (1st P, 2nd P). (1st P: p=0.037; ES: 0.385; 2nd P: 0.039; ES: 0.382). Something similar happened with the rest of the variables, but in no case with statistically significant differences (Table 1). The behavior of these parameters was practically the same when we compared the resumption of the championship with the start of the League. The improvements occurred, practically in all the parameters evaluated with special relevance in what refers to the total distance traveled (1.68%; p=0.040; ES= 0.3797). The fact of playing as a home in the resumption, meant a moderate improvement in the distances traveled (2.44%; p=0519; ES=0.508), with marked differences in the movements made by the players in possession of the ball in the 2nd P of the match (2nd P: 2.61%; p=0.0498; ES=0.4629). The same behavior was observed in the distances traveled by the visiting teams, increasing their distances with respect to the local teams in the 25th-27th and 28th-30th days.
In table 1, we give the total distances traveled, the distances traveled in the ^{1st} P and 2nd P, the distances traveled with total possession and without possession and the routes with possession in the 1st P and in the 2nd P.

Table 1
TOTAL DISTANCES - GLOBAL

PARAMETER	Days 1st-3rd	Days 25th-27th	Days 28th-30th
Distance travelled Total (m)	107662.2 ± 3768.2	107176.3 ± 4927.5	109505.5 ± 5737.4
Distance travelled 1ªParte (m)	54346.4 ± 2367.0	53655.2 ± 2793.5	54784.6 ± 3073.3
Distance travelled Part 2 (m)	53315.8 ± 2434.7	53521.2 ± 3106.3	54720.9 ± 3179.3
Routes with Ball Possession Total (m)	37641.0 ± 7469.7	37396.4 ± 6500.2	38272.9 ± 7967.8
Routes without a Ball Total (m)	40712.9 ± 7648.0	40578.2 ± 7277.9	41873.5 ± 8797.8
Tours with Possession Part 1 (m)	19354.7 ± 4222.8	19166.9 ± 3826.9	19349.9 ± 4738.3
Tours with Possession Part 2 (m)	18286.3 ± 4097.3	18229.4 ± 3496.1	18923.0 ± 3907.1

In table 2, we show the total distances traveled, the distances traveled in the 1st P and 2nd P, the distances traveled with total possession and without possession and the routes with possession in the 1st P and in the 2nd P for the home team.

Table 2
TOTAL DISTANCES - LOCAL

PARAMETER	Days 1st-3rd	Days 25th-27th	Days 28th-29th
Distance travelled	107926.1	107259.1	109880.8
Total (m)	3796,9	5333.7	4975.9
Distance travelled	54498,2	53740,2	54927,7
1ªParte (m)	2382,2	3019,0	2730,2
Distance travelled	53733,5	53519,1	54953,1
Part 2 (m)	2227,7	3380,9	2786,0
Routes with Ball Possession	37064,1	38068,8	40111,5
Total (m)	7531,4	6433,8	7298,8
Routes without a Ball	41381,2	39695,2	40159,4
Total (m)	7542,5	7630,2	9140,8
Tours with Possession	19291,5	19780,3	19986,1
Part 1 (m)	4421,4	3471,0	4589,6
Tours with Possession	17772,6	18288,5	20125,4
Part 2 (m)	3813,6	3721,0	3431,0

In table 3, we show the total distances covered, the distances covered in the 1st P and 2nd P, the distances covered with total possession and without possession and the routes with possession in the 1st P and in the 2nd P for the visiting team.

TABLA 3
TOTAL DISTANCES - VISITORS

PARAMETER	Days 1ST-3rd	Days 25th-27th	Days 28th-29th
Distance travelled	107398.1	107087,5	109130,2
Total (m)	±3785,3	±4545,8	±6474,5
Distance travelled	54194,4	53564,2	54641,4
1ªParte (m)	±2382,5	±2581,0	±2730,2
Distance travelled	53203,8	53523,3	54488,7
Part 2 (m)	±2629,1	±2843,4	±3562,3
Routes with Ball Possession	38217,9	36677,4	43587,6
Total (m)	±7490,4	±6606,5	±7298,8
Routes without a Ball	40044,5	41522,0	40159,4
Total (m)	7822,1	±6888,1	±8236,4
Tours with Possession	19417,8	18511,2	18713,7
Part 1 (m)	±4089,3	±4133,8	±4876,0
Tours with Possession	18800,0	18166,2	17720,6
Part 2 (m)	±4336,2	±3303,3	±4036,6

HIGH INTENSITY TOURS

The efforts of AI, displacements made at speeds 24 km / h, after the break, decreased significantly (6.01%;≥ *ns*), especially in the 1st P (9.01%; p = 0.32;

ES=0.396), although without reaching the levels shown at the beginning of the season. This decrease in the intensity of the actions was manifested in the reduction in the number of high-intensity sprints performed (5.37%; *ns)* and the decrease in average speed (3.59%). This last parameter was mainly reduced in the 1st P of the match (3.88%) (Table 4). However, it was noted that the values mentioned were clearly better than those recorded at the beginning of the League. The distance traveled by AI in this case was higher (10.72%; p=0.01; ES: 0.731), especially in the 2nd P (16.04%; p=0.01; ES: 0.787). This same behavior was detected in the fall of sprints (8.77%; p=0.01; ES: 0.595), especially in Part 2 (12.48%; p≤0.000; ES: 0.595). The average speed was reduced (-1.59%), more in the 1st P of the match (1st P: -2.04% *vs*. 2nd P: -1.00%).

This decrease in the intensity of the actions was also manifested in the resumption, after COVID-19 in local and visiting teams, with special relevance in the distance traveled above 24 km / h during the 1st P (-10.77%; p = 0.053; ES=0.506) and the average speed of travel (-3.59%; p=0.001; ES=1.051) in both time periods (1st P: p=0.0002; ES= 0.557 / 2nd P: p=0.001; ES=0.867). The local teams presented higher values in the parameters related to AI. The difference was significantly higher in the three periods analyzed. However, this was more pronounced when we compared the three days after COVID-19.

When the values of the resumption were compared with the beginning of the season, it was found that the distance traveled at high intensity and the sprints carried out improved. These improvements were statistically significant in the distance traveled to AI in the 2nd P (14.30%; p=0.006; ES=0.733) and in the total number of sprints (9.16%; p=0.016; ES=0.642). However, the average speed of travel worsened (-1.835, p=0.016; ES=0.609), more accentuated in the 1st P (-2.27%; p=0.019; ES=0.633).

In table 4, we show the total high intensity routes, those made in the 1st P and in the 2nd P, the total sprints, those made in each period, the total average speed and that of each period for values >24 km / h (m).

TABLE 4

HIGH INTENSITY EFFORTS
GLOBAL DATA

PARAMETER	Days 1st-3rd	Days 25th-27th	Days 28th-29th
High Intensity Tours Totals >24 km/h (m)	2631.4 ± 432.4	3135.9 ± 612.7	2947.4 ± 432.4
High Intensity Tours 1st Part >24 km/h (m)	1338.0 ± 301.3	1546.0 ± 371.5	1406.7 ± 331.0
High Intensity Tours 2nd Part >24 km/h (m)	1293.4 ± 260.7	1589.9 ± 362.3	1540.6 ± 360.0
Sprints >24 km/h Totals (number)	147.7 ± 20.6	170.6 ± 26.4	161.9 ± 26.7
Sprints >24 km/h Part 1 (number)	75.5 ± 14.2	84.7 ± 15.6	79.4 ± 14.9
Sprints >24 km/h Part 2 (number)	72.2 ± 12.0	85.9 ± 15.6	82.5 ± 16.3
Average Speed Toral (km/h)	8.19 ± 0.20	8.36 ± 0.31	8.06 ± 0.26
Average Speed Part 1 (km/h)	8.35 ± 0.27	8.51 ± 0.37	8.18 ± 0.30
Average Speed Part 2 (km/h)	8.03 ± 0.24	8.21 ± 0.33	7.95 ± 0.27

In table 5, we show the total high intensity routes made in the 1st P and in the 2nd P, the total sprints in each period, the total average speed and that of each period for values >24 km / h (m) for local team.

TABLE 5
HIGH INTENSITY EFFORTS
LOCAL TEAM

PARAMETER	Days 1st-3rd	Days 25th-27th	Days 28th-29th
Total AI Tours >24 kph (m)	2710,1 ±403,5	3249,9 ±672,1	2983,5 ±564,8
Tours AI-1st Part >24 kph (m)	1381,9 ±297,1	1606,6 ±373,3	1433,6 ±307,3
TOURS AI -2nd Part >24 kph (m)	1328,2 ±237,5	1643,3 ±397,1	1549,9 ±355,6
Sprints >24 km/h Totals (number)	149,8 ±20.1	168,4 ±25.5	164.9 ±26.5
Sprints >24 km/h Part 1 (number)	75.8 ±14.8	82.3 ±13.9	81.8 ±14.0
Sprints >24 km/h Part 2 (number)	74.0 ±10.8	86.1 ±15.6	83.1 ±17.5
Average Speed Toral (km/h)	8.20 ±0.22	8.35 ±0.30	8.05 ±0.27
Average Speed Part 1 (km/h)	8.37 ±0.29	8.51 ±0.34	8.18 ±0.31
Average Speed Part 2 (km/h)	8.04 ±0.25	8.18 ±0.34	7.91 ±0.28

In table 6, we show the total high intensity routes made in the 1st P and in the 2nd P, the total sprints carried out in each period, the total average speed and that of each period for values >24 km / h (m) for visitor team.

TABLE 6

AI, SPRINT AND AVERAGE SPEED TOURS-VISITOR DATA

PARAMETER	DAYS 1st-3st	DAYS 25st-30th	DAYS 28th-30th
Total AI Tours >24 kph (m)	2552,6 ±452,48	3014,1 ±526,52	2911,2 ±641,23
Tours AI-1st Part >24 kph (m)	1294,06 ±304,10	1481,2 ±364,84	1379,8 ±356,28
Tours AI-2nd Part >24 kph (m)	1258,59 ±281,59	1532,8 ±318,03	1531,3 ±370,24
Sprints >24 km/h Totals (number)	145,60 ±21,17	172,9 ±27,45	158,8 ±27,01
Sprints >24 km/h Part 1 (number)	75,13 ±13,79	87,20 ±17,07	76,9 ±15,68
Sprints >24 km/h Part 2 (number)	70,4 ±13,103	85,72 ±15,80	81,9 ±15,34
Average Speed Total (km/h)	8,17 ±0,19	8,37 ±0,33	8,07 ±0,25
Average Speed Part 1 (km/h)	8,33 ±0,23	8,51 ±0,41	8,1 ±0,30
Average Speed Part 2 (km/h)	8,01 ±0,23	8,23 ±0,32	7,9783 ±0,27

ACCELERATIONS VS. DECELERATIONS OF DIFFERENT INTENSITY

Evaluating performance only according to the intensity of the displacements can underestimate the true workload to which a player is subjected during the match because it does not consider the energy expenditure associated with the continuous accelerations and decelerations involved in the different technical actions he executes (Russell et al., 2016; Dallen et al., 2016). It should be borne in mind that one of the most interesting characteristics of football is that it is a sport modality in which players constantly perform brief episodes of explosive actions interspersed with more or less long periods of low-intensity activity. The speed that is then required when going on the attack or counterattacking highlights the need to have players not only fast, but also strong (González-De los Reyes; Fernandez-Ortega; & Garavito-Peña. 2019).
The behavior for these values was similar, both in the general data and for the actions based on location; that is, when the competition resumed, better performances were obtained in the range of days (28-30) than in the rest of the ranges (1-3 and 25-27), with greater emphasis on the most intense accelerations and decelerations (34.08%; p=0.0001; ES= 3,887 / 23.91%; p=0.0001; ES=2,609). There were no significant differences in the 2-3 m/s^2 decelerations, although these were slightly higher at the beginning of the competition, compared to the range of days 25th-27th (Table 3).

Table 7 shows the total accelerations and decelerations for the values (2-3m/s² >3 m/s²).

Table 7

ACCELERATIONS AND DECELERATIONS - TOTAL DATA			
PARAMETER	Days 1st-3rd	Days 25th-27th	Days 28th-29th
Accelerations 2-3 m/s²	2622.3 ± 210.5	2826.2 ± 208.2	2847.3 ± 229.1
Accelerations >3 m/s²	912.0 ± 105.3	1385.4 ± 132.3	1383.4 ± 135.4
Decelerations 2-3 m/s²	2446.1 ± 206.6	2396 ± 165.8	2438.3 204.6
Decelerations >3 m/s²	1176.7 ± 117.1	1538.2 ± 150.8	1546.4 ± 162.6

Table 8 shows the total accelerations and decelerations for the values (2-3 m/s² >3 m/s²) local team.

Table 8

ACCELERATIONS AND SLOWDOWNS – LOCAL DATA			
PARAMETER	Days 1st-3rd	Days 25th-27th	Days 28th-30th
Accelerations 2-3 m/s²	2629 ± 228,16	2792,3 ± 220,25	2845,3 ± 222,01
Accelerations >3 m/s²	914,7 ± 113,31	1384,7 ± 132,62	1377,3 ± 129,07
Decelerations 2-3 m/s²	2430,4 ± 222,17	2374,7 ± 170,65	2419,9 ±181,54
Decelerations >3 m/s²	1192,9 ± 128,97	1532,3 ± 146,94	1530,2 ± 165,81

Table 9 shows the total accelerations and decelerations for the values (2-3 m/s² >3 m/s²) visiting team.

PARAMETER	Days 1st-3rd	Days 25th-27th	Days 28th-30th
Accelerations 2-3 m/s²	2615,6 ± 194,82	2862,4 ± 191,66	2849,20 ± 239,82
Accelerations >3m/s²	909,26 ± 98,54	1386,06 ± 134,21	1389,53 ± 143,45
Decelerations 2-3 m/s²	2461,73 ± 192,33	2374,7 ± 170,65	2419,9 ±181,54
Deceleations >3m/s²	1160,4667 ± 103,56	1544,48 ± 157,25	1562,46 ± 160,51

The ANOVA test shows significant differences (p>0.005) especially in the Accelerations and Decelerations (> 3m/s^2), as shown in graphs 1 and 2, being in the days (28th to 30th) where the greatest number of them occur.

Figure 1

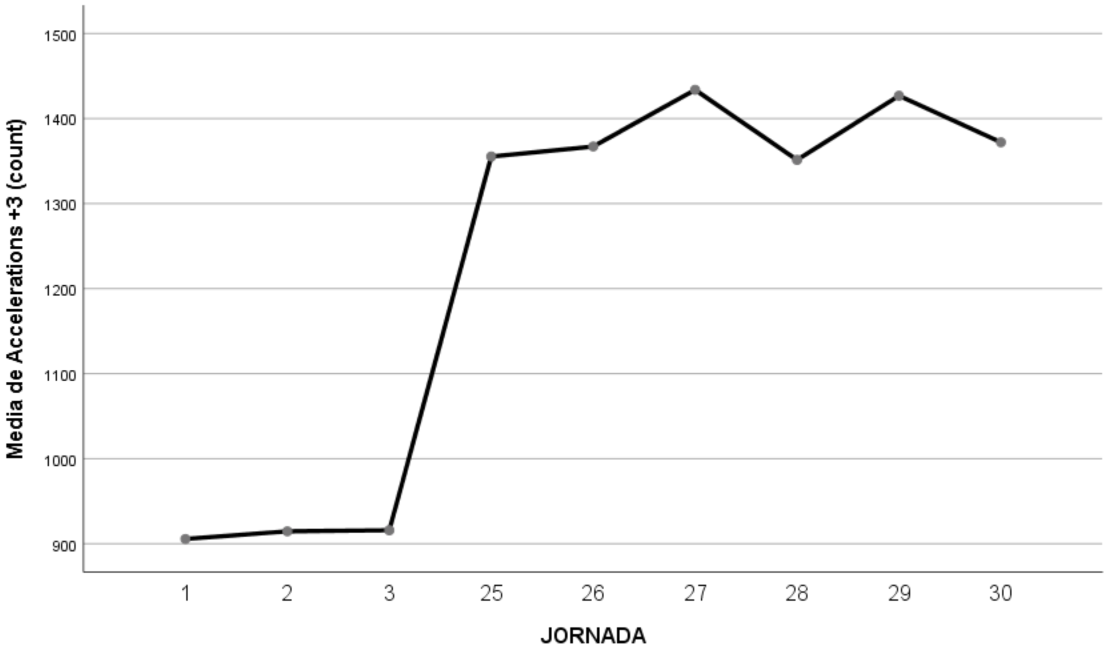

TABLE 10. ANOVA test values for the variable Accelerations >3m/s^2

Variable depfelt	(I) Conference	J (Conference)	Mean difference (I-J)	Desv. Error	Itself.	95% confidence interval	
						Lower Limit	Upper Limit
Aceleraciones (> 3m/s^2)	28	1	445,800*	39,255	,000	318,21	573,39
		2	436,800*	39,255	,000	309,21	564,39
		3	435,550*	39,255	,000	307,96	563,14
		25	-3,900	39,255	1,000	-131,49	123,69
		26	-15,700	39,255	1,000	-143,29	111,89
		27	-82,400	39,255	1,000	-209,99	45,19
		29	-75,400	39,255	1,000	-202,99	52,19
		30	-20,700	39,255	1,000	-148,29	106,89
	29	1	521,200*	39,255	,000	393,61	648,79
		2	512,200*	39,255	,000	384,61	639,79
		3	510,950*	39,255	,000	383,36	638,54
		25	71,500	39,255	1,000	-56,09	199,09
		26	59,700	39,255	1,000	-67,89	187,29
		27	-7,000	39,255	1,000	-134,59	120,59
		28	75,400	39,255	1,000	-52,19	202,99
		30	54,700	39,255	1,000	-72,89	182,29
	30	1	466,500*	39,255	,000	338,91	594,09
		2	457,500*	39,255	,000	329,91	585,09
		3	456,250*	39,255	,000	328,66	583,84
		25	16,800	39,255	1,000	-110,79	144,39
		26	5,000	39,255	1,000	-122,59	132,59
		27	-61,700	39,255	1,000	-189,29	65,89
		28	20,700	39,255	1,000	-106,89	148,29
		29	-54,700	39,255	1,000	-182,29	72,89

Figure 2

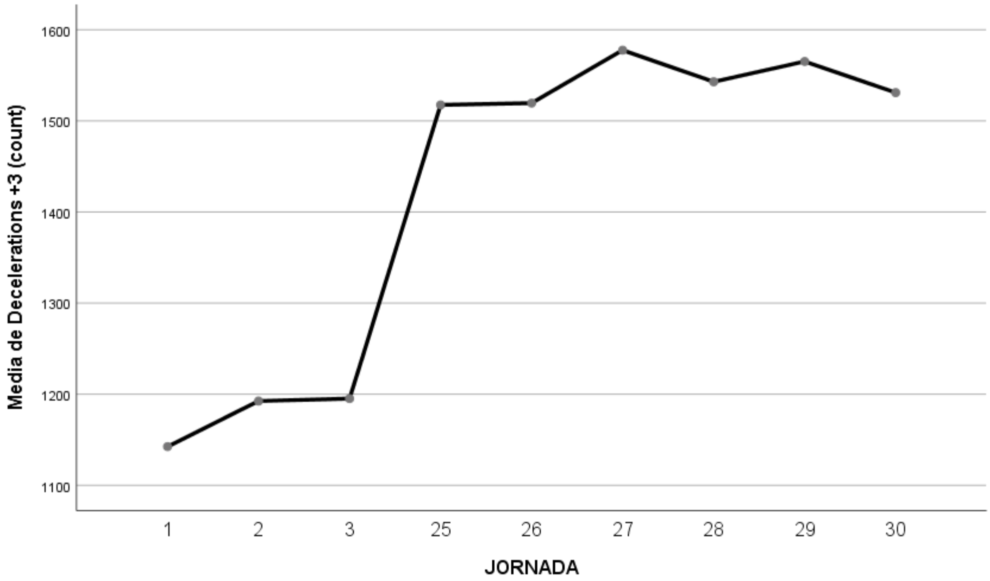

Table 11. ANOVA test values for the variable Decelerations >3m/s²

Variable deepfelt	(I) Conference	J (Conference)	Mean difference (I-J)	Desv. Error	Itself.	95% confidence interval	
						Lower Limit	Upper Limit
Decelerations (> 3m/s²)	28	1	400,450*	45,997	,000	250,95	549,95
		2	350,400*	45,997	,000	200,90	499,90
		3	347,750*	45,997	,000	198,25	497,25
		25	25,400	45,997	1,000	-124,10	174,90
		26	23,400	45,997	1,000	-126,10	172,90
		27	-34,700	45,997	1,000	-184,20	114,80
		29	-22,300	45,997	1,000	-171,80	127,20
		30	11,900	45,997	1,000	-137,60	161,40
	29	1	422,750*	45,997	,000	273,25	572,25
		2	372,700*	45,997	,000	223,20	522,20
		3	370,050*	45,997	,000	220,55	519,55
		25	47,700	45,997	1,000	-101,80	197,20
		26	45,700	45,997	1,000	-103,80	195,20
		27	-12,400	45,997	1,000	-161,90	137,10
		28	22,300	45,997	1,000	-127,20	171,80
		30	34,200	45,997	1,000	-115,30	183,70
	30	1	388,550*	45,997	,000	239,05	538,05
		2	338,500*	45,997	,000	189,00	488,00
		3	335,850*	45,997	,000	186,35	485,35
		25	13,500	45,997	1,000	-136,00	163,00
		26	11,500	45,997	1,000	-138,00	161,00
		27	-46,600	45,997	1,000	-196,10	102,90
		28	-11,900	45,997	1,000	-161,40	137,60
		29	-34,200	45,997	1,000	-183,70	115,30

DISCUSSION

The purpose of this work was to estimate the differences in performance in high-level professional teams after the interruption of the competition due to the COVID-19 pandemic. In addition, this lapse of the competition has caused a competitive density once it has resumed. The scientific evidence linking the overload of the competition calendar with the performance of the teams is inconclusive (Lago-Peñas et. al. 2011). There is some controversy about the physical and technical-tactical performance of footballers in short periods of time (Lago-Peñas, García, & Gómez-López, 2015). On the one hand, for some authors, an excess of matches, in a short time, leads to a decrease in performance (Ekstrand, Walden, & Hagglund, 2004; Reilly, 2006). While, for others, in the last decade, the opposite is true. (Carling, Orhant, & Le Gall, 2010; Rey, Lago-Peñas, Lago-Ballesteros, Casais, & Dellal, 2010; Dupont et al., 2010; Carling, & Dupont, 2011; Lago-Peñas, Rey, Lago-Ballesteros, Casais, & Dominguez, 2011; Carling, Le Gall, & Dupont, 2012; Dellal et al., 2013). These last data agree with our study, in a special way, with what happened after the confinement, where the values obtained for the total distances traveled not only did not decrease, but increased, both in the global data, and when the teams were analyzed according to the location of the match. In line with what was contributed by Lago et al., (2009), the location of the match becomes a variable to take into account; thus, playing at home decreases the distances covered by the players, as could be observed in our study, especially in the 25th-30th days, coinciding with the last period of competition, just before and just after the return to competition after COVID-19, with respect to players acting as visitors. It is true that in this period of competition the rule of possible substitutions is modified, going from three, to a total of five possible changes, this aspect seems to be related to what Carling, Orhant, & Le Gall, (2010) and Dellal et al., (2013) suggest, professional footballers can withstand an overload of matches without a drop in their physical performance for a certain period. The data provided in our study indicated that the total distance covered increased in both parts of the match. With respect to the different periods (Days 1st to 3rd, 25th to 27th and 28th to 30th), it coincided with what was stated by Gómez-Díaz et al., (2013) in the first period analyzed, noting an increase in the total distances traveled in the post-confinement period of competition. We agree with the idea of Castellano (2018) that the physical dimension, total distance traveled by the team (KM), does not allow to establish any relationship to the success or failure of the teams.

On the other hand, maximum intensity actions and sprints (intermittent very high-speed efforts between 1 and 7 seconds performed ≥19.8 km / h) are considered as one of the variables that can contribute to determine performance, because, in these periods of high intensity, it is where the decisive actions of the match are carried out (Bishop et al., 2007). While these events can represent only 0.5-3% of a footballer's activity during a match (Stolen et al., 2005; Buchheit et al., 2010), the random repetition of these can, in some cases, leave insufficient time for full recovery; therefore, interval training (IT) at maximum intensity is of special importance, as an element that improves the capacity of team sports athletes (Taylor et al., 2015). Although, any specific application of IT requires that the type of sport practiced, the duration of the period between intermittent very high-speed efforts and sprints (EMAVS) and the individual characteristics of the athletes themselves be taken into account (Viana et al., 2018), aspects that are closely related to our study in the period that covered from day 25, until 27; that is, once the competition had already been running for seven months, with a single break from competitive activity, of one week, coinciding with the celebration of Christmas. However, this circumstance was not observed for the days; 1, 2, 3, 28, 29 and 30, in which the total high-intensity travel values, both in the 1^{st} and 2^{nd} P,the number of total sprints and the average speed in both periods were slightly lower, in both cases, after a prolonged competitive inactivity that, for the players of the Spanish 1st division League has not been less than eight weeks, without specific training. So, footballers have not been able to develop tasks in which to achieve the variability of the competition (Moras et al., 2018).

Accelerations and decelerations in football are not fully understood. Although, a determining factor in performance is the number of high intensity runs. (Russell et al., 2016). In the specific case of football, more than 85% of the maximum accelerations do not reach high-speed travel categories (>4.17 $m \cdot s^{-29}$) On the other hand, the maximum accelerations >2.78 $m \cdot s^{-2}$, (Varley, & Aughey, 2013); 3 $m \cdot s^{-2}$ (Hodgson et al., 2014) and 4 $m \cdot s^{-2}$ (Buchheit et al., 2014) occur more than eight times as often as sprint actions. Whileto ensure that elite players are optimally prepared for the high-intensity accelerations and decelerations imposed during competitive play, it is imperative that players are exposed to comparable demands under controlled training conditions (Harper, Carling, & Kielv, 2019). These situations that sometimes do not meet the demand of the players is beginning to be very observed, since there are actions at low speed with a high level of acceleration (Castellano et al., 2013). In a study with Norwegian top-level footballers (Rosenborg FC), a lower number of accelerations is observed in the last third of the season, less high-intensity activity, but longer than in other previous studies carried out in higher level leagues. In addition, less high-intensity activity is seen towards the end of the season (Ingebrigtsen et al., 2015). These results do not agree with what was observed in our study in the acceleration section, which showed relatively higher values between days 25-27 than in days 1-3. However, if they were related, with the data obtained after the confinement by COVID 19, which were slightly higher in the 28th-30th days for the same acceleration values.

CONCLUSIONS

The resumption of the competition after the break caused by COVID-19 had different effects depending on each of the parameters analyzed.

The total distances covered increase, both in the local teams and in the visitors. A slight decrease in high-intensity efforts could be seen when the post-confinement period was compared with respect to the three days before the break of the competition. When the first and third periods analyzed werecompared; that is, those who come after a cessation in competitive activity, it can be seen how the values were slightly higher in the last of them.

This same relationship is established when the different types of accelerations and decelerations were analyzed, in which the most significant differences are found between the first period and the third period analyzed. Not so, when the latter was compared with the days before the break of the competition.

We can say, therefore, that the best values occur when there is a route in the competitive period and that the pauses of the cessation of the competition significantly affect all the parameters analyzed.

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