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Research Article

Quantification, Tapering and Positional Analysis of Across 9-Weekly Microcycles in a Professional Chinese Super League Soccer Team

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Abstract

Quantifying the training content within elite professional soccer and analysis of tapering strategies has gained huge interest in recent times within the literature in order to maximise player performance. The formatting of training load tapering (TLT) appears to differ depending on the management in charge and microcycle coaching philosophy. The primary of this investigation was to analyse 9-weekly microcycles used and quantify the tapering strategy utilised through positional differences within a Chinese Superleague soccer team. Twenty-eight (n = 28) elite male professional soccer players participated within the study (± SD, age: 26.7 ± 3.7 years; body height: 181 ± 6.5 cm; body mass: 72.4 ± 4.6 kg) and bodyfat 9.3 ± 2.14 %. Thirty-six training sessions worth of data were collected for assessment with the data inclusive of 9 x 1-week full-training session microcycles per player, per position. Each player's motional analysis were tracked using a 10 Hz GPS device (Statsport, Melbourne, Australia) and RPE scale was completed by each player post-each training session. Results for days preceding a match were shown to all be statistically significant for TDC, TDC.min-1, HSR, HSRmin-1, SP, ED, ED.min-1, and RPE ($p < 0.05$). Furthermore, playing position analysis revealed significant differences between each position across the microcycle structure ($p < 0.05$), but microcycles were non-significant in any of the models obtained (all $p > 0.05$), except for week 4 across the 9-weekly phase. To conclude, this investigation has shown how it is possible to maintain a structured tapering microcycle strategy whilst inducing daily physical outputs but without causing significant fluctuations in the weekly TLs. Furthermore, the investigation has also provided a tapering approach that may induce the significant variation of the positional demands, assisting also with the decoding of the individual conditioning needs of the players.

Keywords: *Soccer; Training; GPS; Training Load; Microcycle; Tapering Strategy*

Introduction

In the last decade, the training demands in soccer have been exponteniously increased in order to meet the high conditioning requirements of numerous competitions. As a consequence of this reality, in order for players to cope with the greater match related conditioning requirements enabling them to maximally perform during competition match-play, the need of ways to control, analyse, and eventually manipulate training sessions has increased. In this context, practitioners involved within the preparation of soccer players seek ways to analyse and examine the training loads, aiming to maximize performance. This involves not only assessing training periodisation and tapering strategies [1,2], but also by recognizing the distinct requirements from training scenarios such as sided-games [3] to various playing position demands and individuals conditioning needs [4]. Literature has shown evidence of how players playing different positions show various outcomes in terms of total distance covered, high intensity runs, accelerations, deceleration parameters that should be taken under consideration when programming the structure of the weekly microcycle [2,5]. The microcycle structure is however, dictated by the physical recovery status and the conditioning requirements of the players generally termed by parameters that can be defined obtaining external and internal load values [5,6]. Recently, research investigating appropriate tapering approaches utilised by practitioners has increased understandably, based on the fact strategies which may enable players to be in better prepared states for competitive match-play is vitally important. Ensuring elite soccer players are in the best possible shape during competition has emerged as a necessity with the aim of minimizing the risk of reduced performance and/or injury occurrence [1].

A widely used approach aiming to maximize training quality and therefore competition performance within a microcylce, is the acquisition of training data and the interpretation of both external and internal training loads [7]. Indeed, global positioning system (GPS) metrics (as indicators of external load) and Rate of perceived exertion (RPE; as subjective indicator of internal load) are widely used within soccer in an attempt to better understand the weekly training routine requirements and also the conditioning needs per playing position [1,8] which will practically result in the application of a progressive and controlled loading of the training stimulus aiming to maximize the training adaptations and to optimize performance. Analysis of the weekly microcycle provides the necessary information regarding the weekly periodization model and also whether this employed model is in accordance with the tapering requirement of the soccer players [2]. The general consensus suggests external load metrics are facing a variation in the weekly training plan towards lower values in the session before the competition, confirming the concept of tapering. Regarding RPE, this is a validated tool that takes into consideration both the intensity and the duration of a training session [9]. The obtained data are used as subjective tools to quantify the internal training load, enabling coaches to manipulate training characteristics (intensity, duration, and volume) in such way to document the proper periodization and tapering, seeking for maximal performance during the competition [9,10].

According to the aforementioned information, it is clear that there is a need to record and to quantify the occurrence and the possible variability of external (as expressed by GPS measures) and internal loading (as expressed by RPE) during a weekly structured microcycle. Interestingly, despite these concepts being well-documented, the variability in load metrics across the microcycle is still relatively unexplored within the literature [5] since the majority of the evidence has targeted the quantification of the competition loads [5,11]. Furthermore, although there is increasing evidence aiming to explore the individual training characteristics per position (in both trainings and competitions) and the data defining the soccer training loads in general, the tapering characteristics within a weekly microcycle, are limited mainly European soccer clubs [5,6].

Therefore, although these data indeed provide insights in the way a weekly microcycle is structured, those metrics cannot be specifically applied in all soccer leagues and teams, due to variations in competition demands, culture, competition numbers, and styles of play (tactics). To the best knowledge of the authors, this is the first study quantifying external and internal load within structured weekly microcycles and also the training requirements of different playing positions in a team participating in the Chinese Super League. As a result, the study aim is threefold: a) quantify external and internal load metrics; b) examine the tapering procedures; and c) examine positional analysis data across the investigation period in line with the microcycle tapering strategy.

Methods

Participants

Twenty Eight elite male professional soccer players participated within the study. Six of the players used in this investigation were members of their respective national teams. Players' age, height, body mass, and bodyfat % (Accuniq BC720, Daejeon, Rep. of Korea), were

(Mean ± SD, age: 26.7 ± 3.7 years; body height: 181 ± 6.5 cm; body mass: 72.4 ± 4.6 kg) 9.3 ± 2.14%, respectively. The players involved within the study were grouped into their following positional roles for assessment across the investigation: Full Backs (FB) (n = 4), Central Defenders (CD) (n = 6), Central Midfielders (CM) (n = 4), and Central Forwards (CF) (n = 5), Wide Forwards (WF) (n = 9). Consent were received from all players to include their data after a brief but detailed explanation about the aims, benefits and risks involved with this investigation. The study were conducted and fully approved by the Sports Science Department at the Football Club involved before the commencement of the assessments. Furthermore, the study met the ethical standards of the researching university.

Procedures, content and study design

The study was conducted over a 9-week period during the mid-to-end phase of the competitive season which was selected to ensure minimal fitness changes. Throughout this period of the season (September-October-November) the team was involved in mostly playing 1 match per week and the data only included sessions performed in the build-up to competitive matches (i.e. 4-day lead into games). Players included within the data collection were selected based on their positions within the team, but inclusive of both starting and non-starting players. The training sessions used for assessment were conducted at the same time of day to reduce the potential effects of circadian variation on the participants. Daily analysis from training microcycles situated within a 1-game week have been used within the study in order to track the positional demands across a structured microcycle. Two-game weeks were not assessed in this study due to the training-load structure varying in the pre-game and post-game training structure. For the reliability and validity of the study, only data from players who performed the full training sessions across the investigation period has been analysed, withdrawing any data from players who were unable to train due to injury or illness. Players were instructed to maintain normal daily food and water intake across the period, and no additional dietary interventions were undertaken throughout the investigation.

Training assessment

A total number of thirty six training sessions of data were collected for assessment and analysis throughout the study, with the data assessment inclusive of 9 x 1-week full-training session microcycles per player, per position: 9 x match day -4 (MD-4), 9 x match day -3 (MD-3), 9 x match day -2 (MD-2), 9 x match day -1 (MD-1). No other data pre-MD-4 were considered for analysis due to not including pitch content. All training sessions (n = 36) during the study period were conducted outdoor on natural grass surface and performed within average temperatures of 19.3 ± 5.11°C. Goalkeeper's data has not been included within the study or data analysis. All players were fully familiarized with the experimental procedures and the training microcycle requirements prior to the present study. Each participant were also extremely familiar with the use of wearing GPS units. During the investigation all training sessions were preceded by a warm-up period of 15 min consisting of soccer specific movements, dynamic flexibility and technical actions. Post-training, player data were assessed and compared with respect to their individual playing position. The 9-week in-season microcycles selected for assessment were as a result of the full-training data compliment in the build up to a 1-game week which in addition minimised the accumulative fatigue of games. Additionally, these weeks were chosen on the basis that 1-game and 4-training sessions were performed within the week following 1 day off for recovery and 1 in-house off-pitch recovery session.

Training analysis (GPS metrics)

For each training session (n = 36) across the 9-weekly microcycles of the investigation, each player's motional analysis were tracked using a 10 Hz GPS device (Statsport, Melbourne, Australia). This type of a system has previously been shown to provide valid and reliable estimates of instantaneous velocity during acceleration, deceleration, and constant-velocity movements during linear, multidirectional, and soccer-specific activities [12]. Each player was assigned a GPS vest that was tightly fitted to their upper torso, holding the receiver

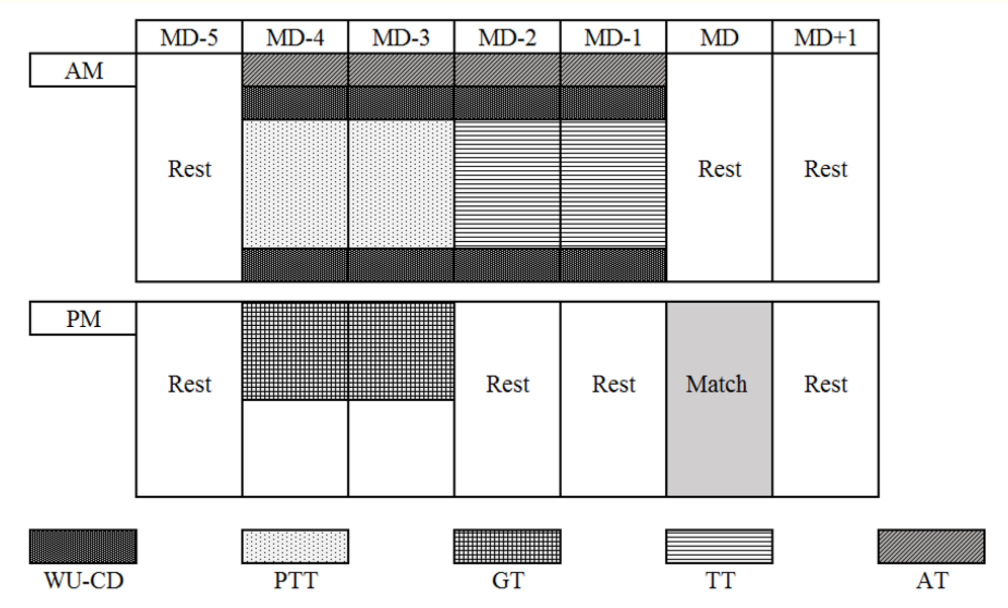

***Figure 1:** Weekly Training Micro-cycle. *WU-CD: warm-up and cool down; PTT: Physical/Technical/Tactical Theme; GT: Gymnasium Training; TT: Technical/Tactical Theme; AT: Activation Training. AM - Morning, PM - Afternoon.*

between the scapulae. All devices were always activated 15 minutes before the data collection to allow acquisition of satellite signals in accordance with the manufacturer's instructions [13]. In addition, to avoid inter-unit error, each player wore the same GPS device for each training session [14]. Within this study, the variables recorded throughout the sessions were the total distance coverage (TDC) and the TDC per minute (TDC.min^{-1}), the high-speed running distance (HSR) set at > 5.5 m/s and the HSR per minute (HSR.min^{-1}) which were set in line with previous research [15,16] and sprint distance (SP) set at > 7 m/s. Additionally, explosive distance (ED) (accumulation of high metabolic load distance achieved at values > 2 m/s^2) and number of sprints (value set as > 7 m/s) taken from the complete training sessions were used for analysis, and ED per minute (ED.min^{-1}).

Rating of perceived exertion (RPE)

A perceived exertion rating scale was completed by each player after a period of ~30 minutes following training session similar to Owen., *et al*. [17] as to ensure the perceived effort of the training session was reliable. Internal RPE values generated for the training sessions were in line with previous research (Foster, 1998). To ensure clarity of the investigation, the modified and translated CR10-scale previously used by Owen., *et al*. [17] was translated into traditional Chinese language for the use within this player cohort. All players were familiar with RPE scaling prior to the commencement of the study as a result of this method used throughout the preparation phase and continued into the season. Furthermore, each individual RPE value was multiplied by the session duration to generate an RPE-training load value for analysis as part of the investigation [2,17].

Statistical analysis

The general linear mixed model (GLMM) were used to analyse the repeated-measures data from unbalanced samples [2]. The present data includes an unbalanced distribution (playing positions, training sessions and microcycles), then the mixed linear model allows to control for the fixed and random effects with unbalanced designs that include missing data from any player. The models performed included microcycles (weeks), days preceding the match (MD-4, MD-3, MD-2 and MD-1) and the various playing positions (CD, FB, CM, CF, WF) as fixed effects and individual players and training sessions as random effects. Results are presented as mean ± SD and their 95% confidence intervals (CIs). Statistical significance were set at $p \leq 0.05$. Furthermore, effect sizes (ES) were calculated to show the magnitude of the effects (standardized differences in means: Cohen's units) with their interpretation being based on the following criteria: < 0.2 trivial, 0.2 to 0.6 small effect, 0.6 to 1.2 moderate effect, 1.2 to 2.0 large effect and > 2.0 very large [18]. The differences between all variables were analysed using magnitude-based inference [19]. The quantitative chances of finding differences in the variables tested were assessed qualitatively as follows: < 1%, almost certainly not; 1 - 5%, very unlikely; 5 - 25%, unlikely; 25 - 75%, possibly; 75 - 95%, likely; 95 - 99%, very likely; > 99%, most likely. Statistical analyses were conducted using Statistical Analysis Software (SAS) for Windows, version 9.4 (SAS Institute Inc., Cary, NC, USA).

Results

Descriptive results for the eight variables studied; TDC (total distance covered), TDC.min^{-1}, HSR (high-speed running), HSR.min^{-1}, SP (sprint distance), ED (explosive distance), ED.min^{-1} and RPE (ratings of perceived exertion/dynamic stress load) are presented in table 1. The fixed factors revealed a significant difference of playing position for TDC ($F_{4, 649} = 3.04$; $p < 0.05$) and HSR ($F_{4, 649} = 2.6$; $p < 0.05$), whereas HSR.min^{-1} ($F_{4, 649} = 1.96$; $p = 0.10$), RPE ($F_{4, 649} = 1.89$; $p = 0.11$), ED ($F_{4, 649} = 1.81$; $p = 0.12$), TDC.min^{-1} ($F_{4, 649} = 1.79$; $p = 0.13$), ED.min^{-1} ($F_{4, 649} = 1.57$; $p = 0.18$), and SP ($F_{4, 649} = 1.43$; $p = 0.22$) shown no significant difference. Days preceding a match were shown to all be statistically significant for TDC ($F_{3, 649} = 69.11$; $p < 0.01$), TDC.min^{-1} ($F_{3, 649} = 4.86$; $p < 0.01$), HSR ($F_{3, 649} = 40.18$; $p < 0.01$), HSRmin^{-1} ($F_{3, 649} = 16.53$; $p < 0.01$), SP ($F_{3, 649} = 23.61$; $p < 0.01$), ED ($F_{3, 649} = 58.28$; $p = 0.01$), ED.min^{-1} ($F_{3, 649} = 22.77$; $p = 0.01$), and RPE ($F_{3, 649} = 106.5$; $p < 0.01$).

	Total distance covered (m)		Total distance covered per minute (m/min)		High speed running (m)		High speed running per minute (m/min)		Sprint (m)		Explosive distance (m)		Explosive distance per minute (m/min)		RPE load (au)	
Days to match / Position	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
4 days																
CD	4480.9	910.0	63.9	10.2	51.5	40.5	0.9	1.1	1.7	5.9	497.8	154.9	6.9	1.6	181.6	64.9
FB	4242.8	969.3	59.5	10.7	55.1	43.5	0.9	1.1	1.2	2.8	487.8	212.7	6.6	2.3	145.4	67.8
CM	4595.5	799.9	63.6	10.7	118.8	199.9	2.2	4.1	5.9	15.4	585.9	186.4	8.5	2.3	195.3	75.1
CF	4584.4	900.7	67.7	11.2	155.3	209.4	3.1	5.4	6.6	15.5	523.2	204.2	7.3	2.1	211.6	86.4
WF	4718.2	929.3	65.2	10.6	73.8	58.5	1.2	1.5	2.3	5.1	554.5	200.4	7.5	2.8	183.9	71.5
Team Mean	4557.6	909.3	64.2	10.8	88.3	130.4	1.6	3.1	3.4	10.0	534.2	194.0	7.4	2.4	184.2	74.9
3 days																
CD	4922.0	649.9	63.2	13.1	183.9	132.6	2.2	1.6	48.6	62.1	535.5	160.0	6.5	2.1	208.9	64.9
FB	4855.8	632.2	56.3	9.3	269.0	138.2	3.1	1.6	63.1	68.0	575.7	138.1	6.7	1.6	178.5	68.8
CM	5431.0	837.4	63.0	11.7	318.9	173.0	3.7	2.1	85.8	78.8	677.0	138.2	7.9	1.8	237.6	98.3
CF	5637.7	559.3	64.5	10.1	351.9	138.7	4.1	1.8	75.6	68.6	708.1	125.2	8.1	1.7	276.4	110.0
WF	5401.0	828.8	64.7	15.6	314.8	161.3	3.6	1.9	60.5	63.9	639.5	171.7	7.3	2.1	202.9	64.9
Team Mean	5254.7	778.4	62.6	13.0	288.0	159.7	3.3	1.9	65.0	67.9	624.8	162.0	7.3	2.0	216.3	84.4
2 days																
CD	2831.7	499.7	57.9	6.3	21.2	21.3	0.4	0.4	2.0	7.1	250.5	74.1	5.0	1.3	103.8	22.0

FB	3014.5	484.8	58.4	5.9	57.7	66.8	1.1	1.2	3.7	9.2	309.7	105.6	5.9	1.7	101.3	41.0
CM	3060.2	484.7	61.0	8.9	28.9	35.0	0.6	0.6	1.7	4.5	315.2	80.4	6.4	1.5	110.0	47.9
CF	3381.9	627.2	62.0	8.8	66.1	49.8	1.2	0.8	7.4	13.9	356.9	86.3	6.5	1.2	153.2	63.0
WF	3079.0	630.3	60.7	8.9	46.1	41.6	0.9	0.8	3.8	9.1	327.8	121.3	6.4	2.0	104.5	36.2
Team Mean	3056.5	572.2	59.9	8.0	43.3	47.1	0.8	0.9	3.6	9.1	311.3	103.8	6.1	1.7	111.2	44.5
1 day																
CD	2499.3	578.9	54.3	16.0	23.8	32.3	0.5	0.6	1.4	4.7	219.4	64.9	4.5	0.8	86.1	26.8
FB	2421.7	546.8	52.9	18.2	35.3	35.1	0.7	0.5	2.4	6.3	216.3	66.0	4.4	1.2	78.5	39.4
CM	2584.1	800.1	50.4	7.1	35.2	24.6	0.7	0.5	0.8	1.4	245.2	86.2	4.8	1.2	89.5	36.8
CF	2624.9	482.3	55.5	17.1	32.7	30.6	0.7	0.6	0.5	1.3	231.0	83.6	4.6	1.6	102.1	42.9
WF	2649.5	720.5	54.0	5.2	47.8	73.9	1.0	1.4	2.3	9.1	247.3	74.9	5.0	1.3	78.6	26.3
Team Mean	2564.1	649.5	53.4	13.0	36.7	48.8	0.7	0.9	1.6	6.2	233.6	75.5	4.7	1.3	85.3	34.5
Positional Mean																
CD	3705.2	1239.3	59.9	12.4	72.3	99.9	1.0	1.3	14.1	38.2	378.5	187.2	5.8	1.8	146.2	71.2
FB	3576.2	1181.7	56.6	12.2	104.2	125.9	1.5	1.5	17.8	43.2	388.8	197.3	5.9	1.9	123.9	67.2
CM	3908.4	1370.1	59.4	11.0	124.7	176.6	1.8	2.7	23.2	53.3	454.6	222.6	6.9	2.3	157.7	91.2
CF	4092.7	1333.8	62.5	13.0	154.8	181.0	2.3	3.3	22.8	47.3	459.8	225.9	6.7	2.1	187.5	103.0
WF	3995.2	1386.0	61.2	11.7	124.7	150.4	1.7	1.9	18.1	42.1	446.8	220.2	6.6	2.3	143.9	74.8
Team Mean	3866.5	1323.3	60.0	12.1	115.8	150.2	1.6	2.2	18.9	44.5	427.1	213.8	6.4	2.2	149.6	82.7
CD: Central Defender; FB: Full Back; CM: Central Midfielder; CF: Central Forward; WF: Wide Forward.																

		Total distance covered (m)				Total distance covered per minute (m/min)			
	Days preceding match	**Mean**		**Diff**	**% Change**	**Mean**		**Diff**	**% Change**
CD	MD-4 / MD-3	4480.9	4922.0	441.1	10%	63.9	63.2	-0.7	-1%
	MD-3/ MD-2	4922.0	2831.7	-2090.3	-42%	63.2	57.9	-5.3	-8%
	MD-2 / MD-1	2831.7	2499.3	-332.4	-12%	57.9	54.3	-3.6	-6%
FB	MD-4 / MD-3	4242.8	4855.8	613.0	14%	59.5	56.3	-3.2	-5%
	MD-3/ MD-2	4855.8	3014.5	-1841.3	-38%	56.3	58.4	2.1	4%
	MD-2 / MD-1	3014.5	2421.7	-592.8	-20%	58.4	52.9	-5.5	-9%
CM	MD-4 / MD-3	4595.5	5431.0	835.5	18%	63.6	63.0	-0.6	-1%
	MD-3/ MD-2	5431.0	3060.2	-2370.8	-44%	63.0	61.0	-2.0	-3%
	MD-2 / MD-1	3060.2	2584.1	-476.1	-16%	61.0	50.4	-10.6	-17%
CF	MD-4 / MD-3	4584.4	5637.7	1053.3	23%	67.7	64.5	-3.2	-5%
	MD-3/ MD-2	5637.7	3381.9	-2255.8	-40%	64.5	62.0	-2.5	-4%
	MD-2 / MD-1	3381.9	2624.9	-757.0	-22%	62.0	55.5	-6.5	-10%
WF	MD-4 / MD-3	4718.2	5401.0	682.8	14%	65.2	64.7	-0.5	-1%
	MD-3/ MD-2	5401.0	3079.0	-2322.0	-43%	64.7	60.7	-4.0	-6%
	MD-2 / MD-1	3079.0	2649.5	-429.5	-14%	60.7	54.0	-6.7	-11%

Team Average	MD-4 / MD-3	4524.4	5249.5	725.1	16%	64.0	62.3	-1.6	-3%
	MD-3/ MD-2	5249.5	3073.5	-2176.0	-41%	62.3	60.0	-2.3	-4%
	MD-2 / MD-1	3073.5	2555.9	-517.6	-17%	60.0	53.4	-6.6	-11%
CD: Central Defender; FB: Full Back; CM: Central Midfielder; CF: Central Forward; WF: Wide Forward.									

		High speed running (m)				High speed running per minute (m/min)			
	Days preceding match	**Mean**		**Diff**	**% Change**	**Mean**		**Diff**	**% Change**
CD	MD-4 / MD-3	51.5	183.9	132.4	257%	0.9	2.2	1.3	144%
	MD-3/ MD-2	183.9	21.2	-162.7	-88%	2.2	0.4	-1.8	-82%
	MD-2 / MD-1	21.2	23.8	2.6	12%	0.4	0.5	0.1	25%
FB	MD-4 / MD-3	55.1	269.0	213.9	388%	0.9	3.1	2.2	244%
	MD-3/ MD-2	269.0	57.7	-211.3	-79%	3.1	1.1	-2.0	-65%
	MD-2 / MD-1	57.7	35.3	-22.4	-39%	1.1	0.7	-0.4	-36%
CM	MD-4 / MD-3	118.8	318.9	200.1	168%	2.2	3.7	1.5	68%
	MD-3/ MD-2	318.9	28.9	-290.0	-91%	3.7	0.6	-3.1	-84%
	MD-2 / MD-1	28.9	35.2	6.3	22%	0.6	0.7	0.1	17%
CF	MD-4 / MD-3	155.3	351.9	196.6	127%	3.1	4.1	1.0	32%
	MD-3/ MD-2	351.9	66.1	-285.8	-81%	4.1	1.2	-2.9	-71%
	MD-2 / MD-1	66.1	32.7	-33.4	-51%	1.2	0.7	-0.5	-42%
WF	MD-4 / MD-3	73.8	314.8	241.0	327%	1.2	3.6	2.4	200%
	MD-3/ MD-2	314.8	46.1	-268.7	-85%	3.6	0.9	-2.7	-75%
	MD-2 / MD-1	46.1	47.8	1.7	4%	0.9	1.0	0.1	11%
Team Average	MD-4 / MD-3	90.9	287.7	196.8	217%	1.7	3.3	1.7	101%
	MD-3/ MD-2	287.7	44.0	-243.7	-85%	3.3	0.8	-2.5	-75%
	MD-2 / MD-1	44.0	35.0	-9.0	-21%	0.8	0.7	-0.1	-14%
CD: Central Defender; FB: Full Back; CM: Central Midfielder; CF: Central Forward; WF: Wide Forward.									

		Sprint				Explosive distance (m)				Explosive distance (m/min)				RPE Load (au)			
	Days preceding match	**Mean**		**Diff**	**% Change**	**Mean**		**Diff**	**% Change**	**Mean**		**Diff**	**% Change**	**Mean**		**Diff**	**% Change**
CD	MD-4 / MD-3	1.7	48.6	46.9	2759%	497.8	535.5	37.7	8%	6.9	6.5	-0.4	-6%	181.6	208.9	27.3	15%
	MD-3/ MD-2	48.6	2	-46.6	-96%	535.5	250.5	-285.0	-53%	6.5	5	-1.5	-23%	208.9	103.8	-105.1	-50%
	MD-2 / MD-1	2	1.4	-0.6	-30%	250.5	219.4	-31.1	-12%	5	4.5	-0.5	-10%	103.8	86.1	-17.7	-17%
FB	MD-4 / MD-3	1.2	63.1	61.9	5158%	487.8	575.7	87.9	18%	6.6	6.7	0.1	2%	145.4	178.5	33.1	23%
	MD-3/ MD-2	63.1	3.7	-59.4	-94%	575.7	309.7	-266.0	-46%	6.7	5.9	-0.8	-12%	178.5	101.3	-77.2	-43%
	MD-2 / MD-1	3.7	2.4	-1.3	-35%	309.7	216.3	-93.4	-30%	5.9	4.4	-1.5	-25%	101.3	78.5	-22.8	-23%
CM	MD-4 / MD-3	5.9	85.8	79.9	1354%	585.9	677	91.1	16%	8.5	7.9	-0.6	-7%	195.3	237.6	42.3	22%
	MD-3/ MD-2	85.8	1.7	-84.1	-98%	677	315.2	-361.8	-53%	7.9	6.4	-1.5	-19%	237.6	110	-127.6	-54%
	MD-2 / MD-1	1.7	0.8	-0.9	-53%	315.2	245.2	-70.0	-22%	6.4	4.8	-1.6	-25%	110	89.5	-20.5	-19%

CF	MD-4 / MD-3	6.6	75.6	69.0	1045%	554.5	639.5	85.0	15%	7.3	8.1	0.8	11%	211.6	276.4	64.8	31%
	MD-3/ MD-2	75.6	7.4	-68.2	-90%	639.5	327.8	-311.7	-49%	8.1	6.5	-1.6	-20%	276.4	153.2	-123.2	-45%
	MD-2 / MD-1	7.4	0.5	-6.9	-93%	327.8	247.3	-80.5	-25%	6.5	4.6	-1.9	-29%	153.2	102.1	-51.1	-33%
WF	MD-4 / MD-3	2.3	60.5	58.2	2530%	554.5	639.5	85.0	15%	7.5	7.3	-0.2	-3%	183.9	202.9	19.0	10%
	MD-3/ MD-2	60.5	3.8	-56.7	-94%	639.5	327.8	-311.7	-49%	7.3	6.4	-0.9	-12%	202.9	104.5	-98.4	-48%
	MD-2 / MD-1	60.5	3.8	-56.7	-94%	327.8	247.3	-80.5	-25%	6.4	5	-1.4	-22%	104.5	78.6	-25.9	-25%
Team Aver-age	MD-4 / MD-3	3.54	66.72	63.2	1785%	529.84	627.16	97.3	18%	7.36	7.3	-0.1	-1%	183.56	220.86	37.3	20%
	MD-3/ MD-2	66.72	3.72	-63.0	-94%	627.16	312.02	-315.1	-50%	7.3	6.04	-1.3	-17%	220.86	114.56	-106.3	-48%
	MD-2 / MD-1	3.72	1.48	-2.2	-60%	312.02	231.84	-80.2	-26%	6.04	4.66	-1.4	-23%	114.56	86.96	-27.6	-24%
CD: Central Defender; FB: Full Back; CM: Central Midfielder; CF: Central Forward; WF: Wide Forward.																	

Playing positions/variables

The results for playing position revealed overall (See figure 2-9), CF (4092.6 [3840, 4350] m) reported significantly higher TDC values compared to CD (3705.2 [3490, 3920] m, ES = 0.30, small; $p < 0.05$; likely). Furthermore, CF (ES = 0.41, small; $p < 0.01$, very likely), WF (3995.2 [3810, 4180] m, ES = 0.33, small; $p < 0.05$, likely), and CM (3908.4 [3670, 4150] m, ES = 0.26, small; $p < 0.05$, likely) reported significantly higher values compared to FB (3576.2 [3370, 3780] m). The TDC.min^{-1} values for CF (62.5 [60, 65] m/min^{-1}, ES = 0.47, small; $p < 0.05$; likely) and WF (61.2 [59.7, 62.7] m/min^{-1}, ES = 0.38, small; $p < 0.05$; likely) were significantly higher compared to FB (56.6 [54.5, 58.7] m/min^{-1}). The HSR values for CF (154.8 [120, 189] m, ES = 0.56, small; $p < 0.01$, very likely), CM (124.7 [93.4, 156] m, ES = 0.37, small; $p < 0.05$, likely) and WF (124.7 [105, 144] m, ES = 0.41, small; $p < 0.05$, likely) were all significantly higher compared to CD (72.3 [55.3, 89.3] m). The HSR.min^{-1} values for CF (2.32 [1.7, 2.94] m/min^{-1}, ES = 0.52, small; $p < 0.01$, likely), and WF (1.69 [1.45, 1.93] m/min^{-1}, ES = 0.42, small; $p < 0.05$, possibly) were significantly higher compared to CD (1.02 [0.80, 1.24] m/min^{-1}).

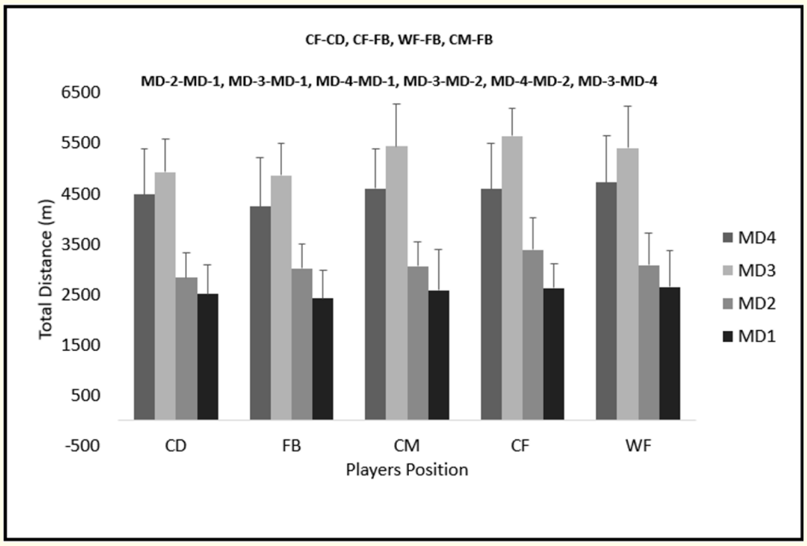

Figure 2: *Players' training load data for total distance covered (TDC) across the days before a match (MD-4, MD-3, MD-2, MD-1) and player's position. Data was presented as mean + SD. CD: Central Defender; FB: Full Back; CM: Central Midfielder; CF: Central Forward; WF: Wide Forward. CF-CD: Significant differences between central forward and central defender; CF-FB: Significant differences between central forward and full back; WF-FB: Significant differences between wide forward and full back; and CM-FB: Significant differences between central midfielder and full back. MD-2-MD-1: Significant differences between two and one days to match; MD-3-MD-1: Significant differences between three and one days to match; MD-4-MD-1: Significant differences between four and one days to match; MD-3-MD-2: Significant differences between three and two days preceding a match; MD-4-MD-2: Significant differences between four and two days preceding a match; and MD-3-MD-4: significant differences between three and four days preceding a match.*

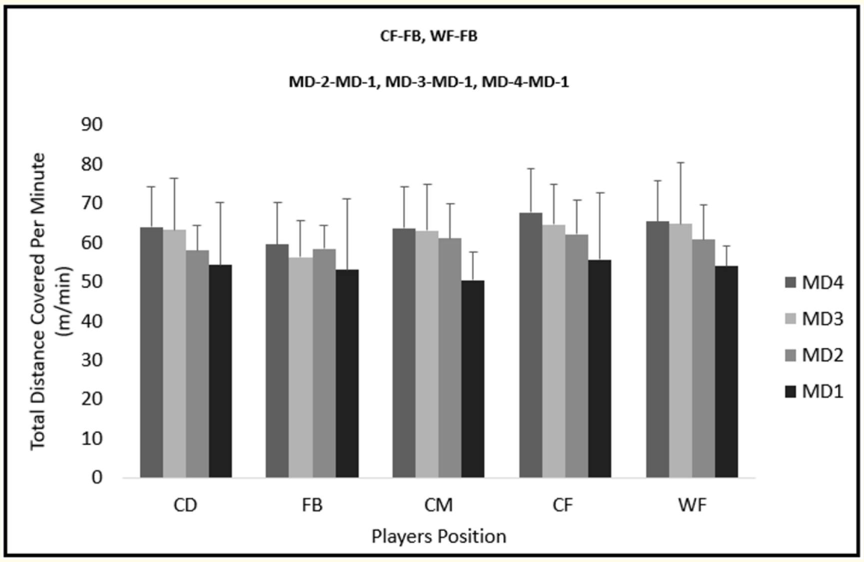

Figure 3: *Players' training load data for average speed (TDC.min-1) across the days before a match (MD-4, MD-3, MD-2, MD-1) and player's position. Data was presented as mean + SD. CD: Central Defender; FB: Full Back; CM: Central Midfielder; CF: Central Forward; WF: Wide Forward. CF-FB: Significant differences between central forward and full back; WF-FB: Significant differences between wide forward and full back. MD-2-MD-1: Significant differences between two and one days to match; MD-3-MD-1: Significant differences between three and one days to match; and MD-4-MD-1: Significant differences between four and one day preceding a match.*

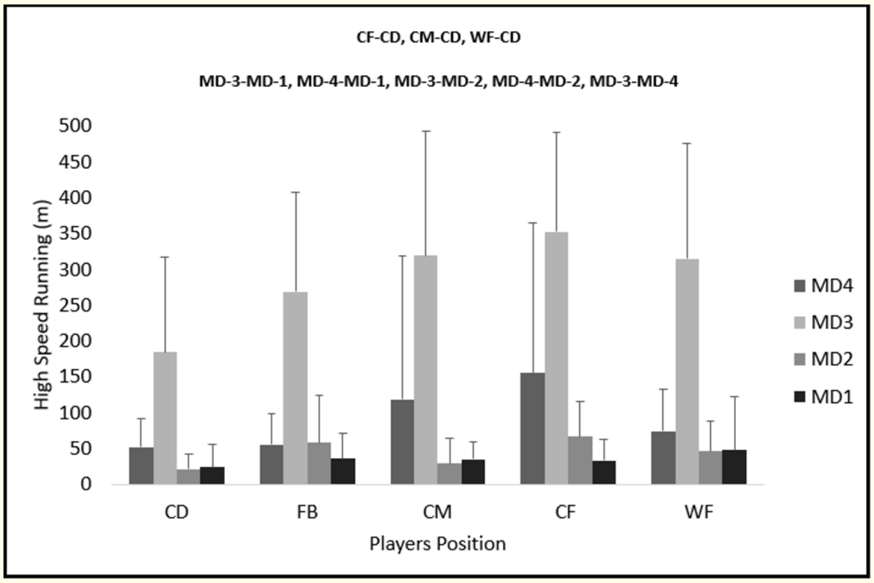

Figure 4: *Players' training load data for high speed running (HSR) across the days before a match (MD-4, MD-3, MD-2, MD-1) and player's position. Data was presented as mean + SD. CD: Central Defender; FB: Full Back; CM: Central Midfielder; CF: Central Forward; WF: Wide Forward. CF-CD: Significant differences between central forward and central defender; CM-CD: Significant differences between central midfielder and central defender; WF-CD: Significant differences between wide forward and central defender. MD-3-MD-1: significant differences between three and one days to match; MD-4-MD-1: Significant differences between four and one days to match; MD-3-MD-2: Significant differences between three and two days preceding a match; MD-4-MD-2: Significant differences between four and two days preceding a match; and MD-3-MD-4: significant differences between three and four days preceding a match.*

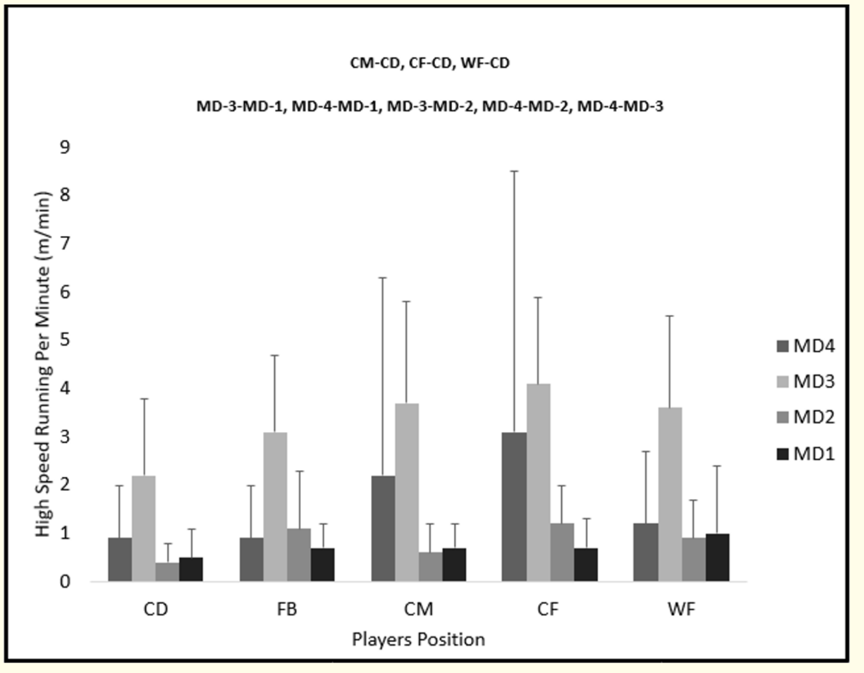

Figure 5: *Players' training load data for high speed running (HSR.min-1) across the days before a match (MD-4, MD-3, MD-2, MD-1) and player's position. Data was presented as mean + SD. CD: Central Defender; FB: Full Back; CM: Central Midfielder; CF: Central Forward; WF: Wide Forward. CM-CD: Significant differences between central midfielder and central defender; CF-CD significant differences between central forward and central defender; and WF-CD significant differences between wide forward and central defender. MD-3-MD-1: Significant differences between three and one days to match; MD-4-MD-1: Significant differences between four and one days to match; MD-3-MD-2: Significant differences between three and two days preceding a match; MD-4-MD-2: Significant differences between four and two days preceding a match; and MD-4-MD-3: Significant differences between four and three days preceding a match.*

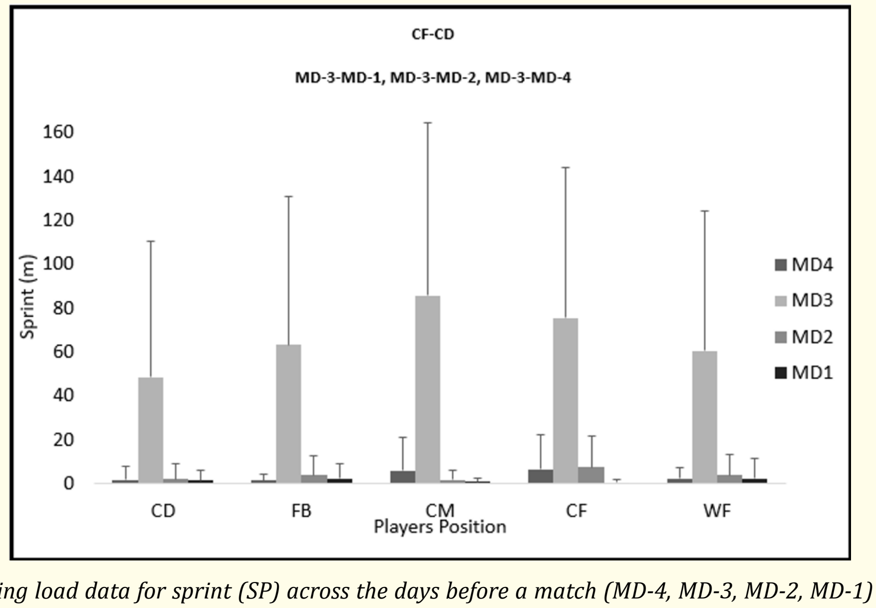

Figure 6: *Players' training load data for sprint (SP) across the days before a match (MD-4, MD-3, MD-2, MD-1) and player's position. Data was presented as mean + SD. CD: Central Defender; FB: Full Back; CM: Central Midfielder; CF: Central Forward; WF: Wide Forward. CF-CD: Significant differences between central forward and central defender. MD-3-MD-1: Significant differences between three and one days to match; MD-3-MD-2: Significant differences between three and two days preceding a match; and MD-3-MD-4: Significant differences between three and four days preceding a match.*

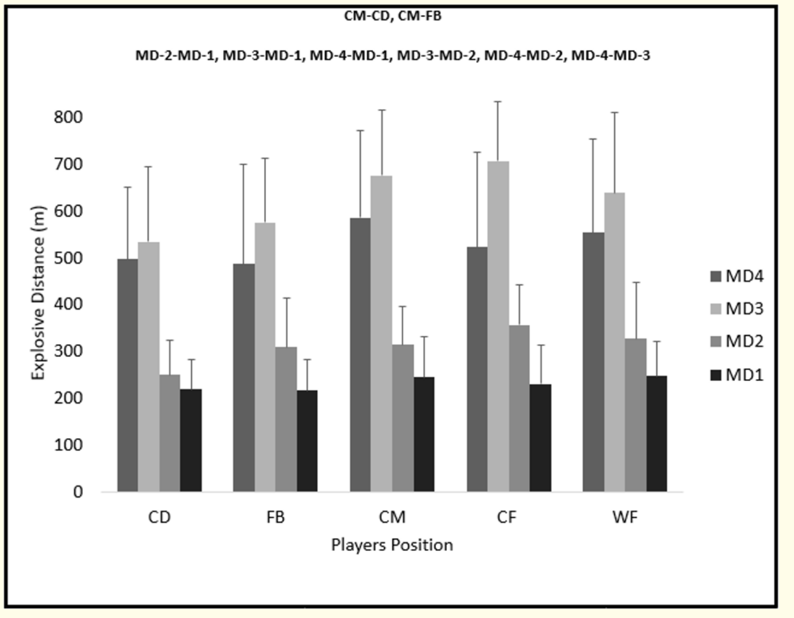

Figure 7: *Players' training load data for explosive distance (ED) across the days before a match (MD-4, MD-3, MD-2, MD-1) and player's position. Data was presented as mean + SD. CD: Central Defender; FB: Full Back; CM: Central Midfielder; CF: Central Forward; WF: Wide Forward. CM-CD: Significant differences between central midfielder and central defender; and CM-FB: Significant differences between central midfielder and full back. MD-2-MD-1: Significant differences between two and one days to match; MD-3-MD-1: Significant differences between three and one days to match; MD-4-MD-1: Significant differences between four and one days to match; MD-3-MD-2: Significant differences between three and two days to match; MD-4-MD-2: Significant differences between four and two days to match; and MD-4-MD-3: Significant differences between four and three days to match.*

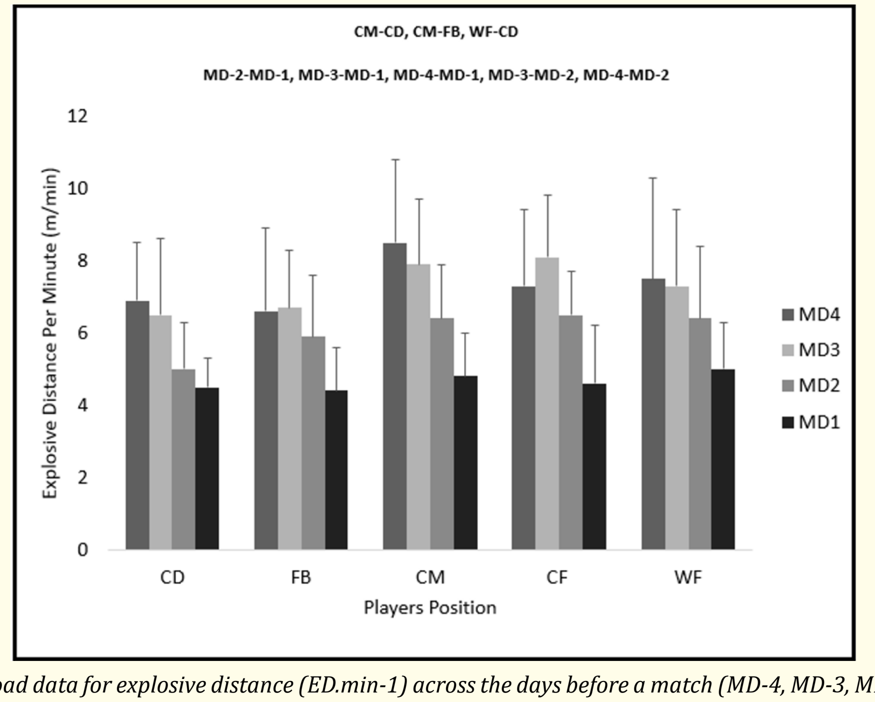

Figure 8: *Players' training load data for explosive distance (ED.min-1) across the days before a match (MD-4, MD-3, MD-2, MD-1) and player's position. Data was presented as mean + SD. CD: Central Defender; FB: Full Back; CM: Central Midfielder; CF: Central Forward; WF: Wide Forward. CM-CD: Significant differences between central midfielder and central defender; CM-FB: Significant differences between central midfielder and full back; and WF-CD: Significant differences between wide forward and central defender. MD-2-MD-1: Significant differences between two and one days to match; MD-3-MD-1: Significant differences between three and one days to match; MD-4-MD-1: Significant differences between four and one days to match; MD-3-MD-2: Significant differences between three and two days to match; and MD-4-MD-2: Significant differences between four and two days to match.*

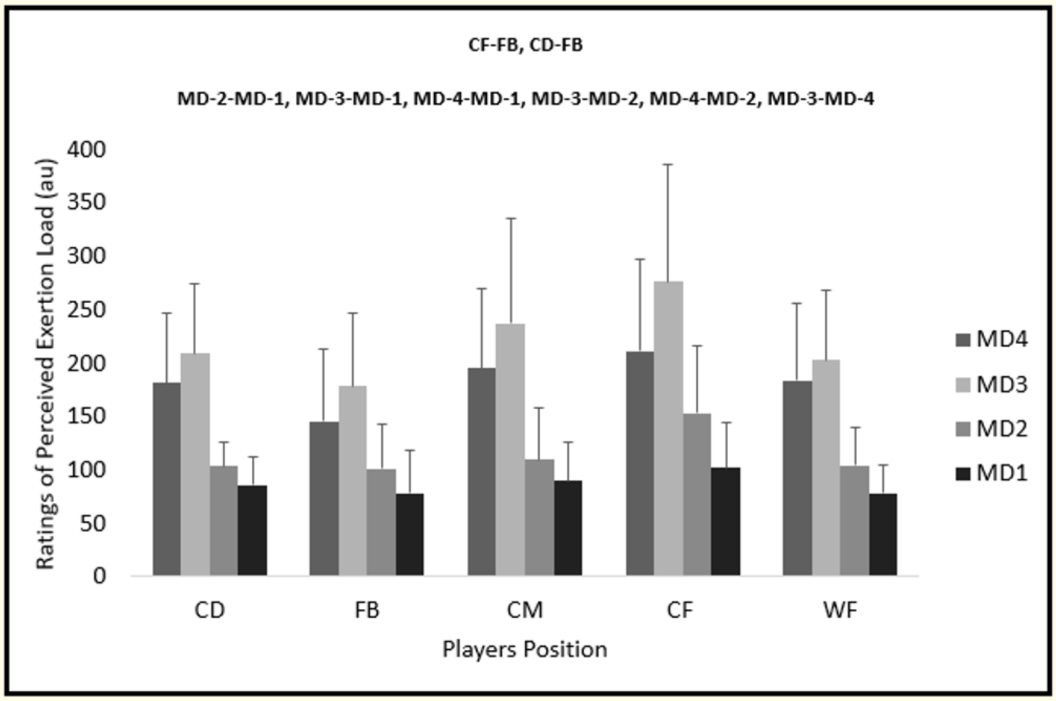

Figure 9: *Players' training load data for rating of perceived exertion load (RPE) across the days before a match (MD-4, MD-3, MD-2, MD-1) and player's position. Data was presented as mean + SD. CD: Central Defender; FB: Full Back; CM: Central Midfielder; CF: Central Forward; WF: Wide Forward. CF-FB: Significant differences between central forward and full back; CD-FB: Significant differences between central defender and full back. MD-2-MD-1: Significant differences between two and one days to match; MD-3-MD-1: Significant differences between three and one days to match; MD-4-MD-1: Significant differences between four and one days to match; MD-3-MD-2: Significant differences between three and two days preceding a match; MD-4-MD-2: Significant differences between four and two days preceding a match; and MD-3-MD-4: Significant differences between three and four days preceding a match.*

Similarly, for SP, CF (22.8 [13.8, 31.8] m, ES = 0.2, small; $p < 0.05$, possibly) had significantly higher values compared to CD (14.1 [7.58, 20.6] m). The results for ED revealed CM (454.6 [415, 494] m), reported significantly higher values for ED compared to CD (378.5 [347, 410] m, ES = 0.37, small; $p < 0.05$, likely), and FB (388.8 [355, 423] m, ES = 0.31, small; $p < 0.05$, likely). Similarly for ED. min^{-1}, CM (6.9 [6.5, 7.3] m/min^{-1}, ES = 0.55, small; $p < 0.05$, likely), had significantly higher values compared to CD (5.7 [5.4, 6.0] m/min^{1}).

The RPE values for CF (187.5 [168, 207] au, ES = 0.73, moderate; $p < 0.05$, very likely) and CD (146.2 [134, 158] au, ES = 0.32, small; $p < 0.05$, likely) were significantly higher compared to FB (123.9 [112, 136] au).

Days preceding match day/variables

The periodised results leading towards the match (See figure 1-8) revealed significant differences between MD-3 (5254.7 [5140, 5370] m, ES = 3.75, very large; $p < 0.01$, most likely), MD-4 (4557.6 [4420, 4690] m, ES = 2.52, very large; $p < 0.01$, most likely) and MD-2 (3056.5 [2970, 3140] m, ES = 0.80, moderate; $p < 0.01$, very likely) compared to MD-1 (2564.1 [2470, 2660] m) for TDC. Furthermore, MD-3 (ES = 3.22, very large; $p < 0.01$, most likely) and MD-4 (ES = 1.98, large; $p < 0.01$, most likely) reported significantly higher values compared to MD-2 (3056.5 [2970, 3140] m).

Similarly, MD-3 (ES = 0.82, large; $p < 0.05$, very likely) reported significantly higher values compared to MD-4. The TDC.min^{-1} values for MD-4 (64.2 [62.6, 65.8] m/min^{-1}, ES = 0.90, moderate; $p < 0.01$, most likely), MD-3 (62.6 [60.7, 64.5] m/min^{-1}, ES = 0.71, moderate; $p < 0.01$, very likely), and MD-2 (59.9 [58.7, 61.1] m/min^{-1}, ES = 0.60, moderate; $p < 0.05$, likely) were significantly higher compared to MD-1 (53.4 [51.5, 55.3] m/min^{-1}). Also, MD-3 (288 [265, 311] m, ES = 2.07, very large; $p < 0.01$, most likely) and MD-4 (88.3 [69, 108] m, ES = 0.52, small; $p < 0.01$, most likely) obtained significantly higher HSR values compared to MD-1 (36.7 [29.6, 43.8] m). MD-3 (ES = 2.07, very large; $p < 0.01$, most likely) and MD-4 (ES = 0.46, small; $p < 0.01$, very likely) also obtained significantly higher values compared to MD-2 (43.3 [36.3, 50.3] m). Whereas, MD-3 (ES = 1.37, large; $p < 0.01$, most likely) shown significantly higher values compared to MD-4.

The HSR.min^{-1} values for MD-3 (3.34 [3.06, 3.62] m/min^{-1}) were significantly higher compared to MD-1 (0.72 [0.58, 0.85] m/min^{-1}, ES = 1.74, large; $p < 0.01$, most likely), MD-2 (0.82 [0.69, 0.95] m/min^{-1}, ES = 1.70, large; $p < 0.01$), most likely, and MD-4 (1.57 [1.12, 2.02] m/min^{-1}, ES = 0.69, moderate; $p < 0.01$, most likely. Whereas MD-4 also shown significantly higher values compared to MD-4 (1.57 [1.12, 2.02] m/min^{-1}) obtained higher values compared MD-1 (ES = 0.38, small; $p < 0.05$, likely), and MD-2 (ES = 0.33, small; $p < 0.05$, likely). SP were significantly higher for MD-3 (65 [55.2, 74.8] m) for all days preceding a match, MD-1 (1.6 [0.7, 2.5] m, ES = 1.32, large; $p < 0.01$, most likely), MD-2 (3.6 [2.24, 4.96] m, ES = 1.27, large; $p < 0.01$, most likely) and MD-4 (3.4 [1.92, 4.88] m, ES = 1.27, large; $p < 0.01$, most likely).

The ED values for MD-3 (624.80 [601, 648] m) were significantly higher compared to MD-1 (233.62 [223, 245] m, ES = 3.01, very large; $p < 0.01$, most likely), MD-2 (311.25 [296, 327] m, ES = 2.30, very large; $p < 0.01$, most likely), and MD-4 (534.21 [506, 563) m, ES = 0.51, small; $p < 0.05$, likely. Similarly, MD-4 (534.21 [506, 563] m) values were significantly higher compared to MD-1 (233.62 [223, 245] m, ES = 2.04, very large; $p < 0.01$, most likely), and MD-2 (311.25 [296, 327] m, ES = 1.43, large; $p < 0.01$, most likely). Whereas, MD-2 (311.25 [296, 327] m) obtained significantly higher values compared to MD-1 (233.62 [223, 245] m, ES = 0.86, moderate; $p < 0.05$, very likely).

The ED.min^{-1} values for MD-3 (7.28 [6.99, 7.57] m/min^{-1}) were significantly higher compared to MD-1 (4.71 [4.53, 4.89] m/min^{-1}, ES = 1.54, large; $p < 0.01$, most likely), and MD-2 (6.06 [5.8, 6.32] m/min^{-1}, ES = 0.66, moderate; $p < 0.01$, very likely). Similarly, MD-4 (7.40 [7.05, 7.75] m/min^{-1}) obtained significantly higher values compared to MD-1 (4.71 [4.53, 4.89] m/min^{-1}, ES = 1.42, large; $p < 0.01$, most likely), and MD-2 (6.06 [5.8, 6.32] m/min^{-1}, ES = 0.65, moderate; $p < 0.01$, very likely). Whereas, MD-2 (6.06 [5.8, 6.32] m/min^{-1}) obtained significantly higher values compared to MD-1 (4.71 [4.53, 4.89] m/min^{-1}, ES = 0.9, moderate; $p < 0.01$, most likely).

The RPE values for MD-3 (216.2 [204, 228] au, ES = 2.03, very large; $p < 0.01$, most likely), MD-4 (184.2 [173, 195] au, ES = 1.7, large; $p < 0.01$, most likely), and MD-2 (111.2 [105, 118] au, ES = 0.65, moderate; $p < 0.01$, most likely) were significantly higher compared to MD-1 (85.3 [80.3, 90.3] au). Similarly, MD-3 (ES = 1.56, large; $p < 0.01$, most likely) and MD-4 (ES = 1.18, moderate; $p < 0.01$, most likely) shown significantly higher values compared to MD-2 (111.2 [105, 118] au). Whereas, MD-3 (ES = 0.40, small; $p < 0.01$, likely) shown significantly higher values compared to MD-4.

Microcycle (week)/variables

The results from the GLMM showed how microcycles (9-week periods) were non-significant in any of the models obtained (all $p > 0.05$), except for significantly higher values obtained for week4 (65.4 [63.3, 67.5] min^{-1}, ES = 0.98, moderate; $p < 0.05$, very likely), week2 (64.8 [61.6, 68] min^{-1}, ES = 0.79, moderate; $p < 0.05$, very likely), and week8 (62.7 [60.2, 65.2] min^{-1}, ES = 0.73, moderate; $p < 0.05$, likely) compared to week6 (53.3 [50.2, 56.4] min^{-1}) for total TDC.min^{-1}.

The ED values for week5 (489.24 [442, 536] m, ES = 0.69, moderate, $p < 0.01$, very likely), and week6 (450.98 [410, 492] m, ES = 0.55, small, $p < 0.05$), likely), obtained significantly higher values compared to Week2 (346.82 [307, 387] m). Whereas, week8 (7.22 [6.7, 7.7] m/min^{-1}) shown significantly higher values for ED.min^{-1} compared to week2 (5.9 [4.4, 6.4] m/min^{-1}, ES = 0.63, moderate, $p < 0.05$, likely), and week6 (5.73 [5.2, 6.2] min^{-1}, ES = 0.67, moderate, $p < 0.05$, very likely). Furthermore, week6 (169.2 [151, 188] au) RPE values were significantly higher compared to week7 (134.6 [117, 152] au, ES = 0.42, small; $p < 0.05$, very likely), week 9 (138.3 [119, 158] au, ES = 0.37, small; $p < 0.05$, likely), and week8 (144.6 [125, 164] au, ES = 0.29, small; $p < 0.05$, likely).

Discussion

The aim of the current study was to quantify the external and internal load metrics, the positional demands and to examine the tapering procedures, across 9-weekly microcycles in a professional Chinese Super League soccer team. In agreement with the traditional tapering and periodisation methods, a TL variation (TDC, HSR, ED, RPE) across the last phase of the microcycle was observed with MD-4, MD-3 and MD-2 being a significantly reduced TL vs. MD-1. This is in-line with previous research in this area suggesting a tapering approach with a reduced TL [1,2], suggesting a distinctive tapering methodology was employed in order to uplift player readiness pre-competition. Furthermore, our findings provide supportive evidence to the observation that during the in-season period only slightly insignificant variations between the weekly training microcycles exist. Lastly, this study clearly suggests that the external and internal load metrics vary through different positions, but also variations can be also evident within teams participating in different championships, and these differences are associated with parameters such as the style of play, the competition demands, the culture, and the competition numbers.

Microcycle differences

The observation of the examined microcycles during this 9-week period were generally non-significant in any of the models obtained apart from some differences in AS and RPE between specific weeks (higher values in weeks 4 and 8 vs week 6 for AS and higher values in week 6 vs weeks 7, 8 and 9 for RPE) are in accordance with the available literature showing limited variation through the in-season competition period [2,14,20,21]. According to this finding we could suggest that in professional soccer players during the competition period a regular load pattern is followed. This pattern could be modified according to individual and/or squad levels of fatigue, player fatigue, stress, muscle soreness, recovery needs, conditioning needs and forthcoming competition schedule. According to Gabbett [7] ensuring the TL changes remain minimal from week to week with no 'spikes', the potential for injury remains low, however this combined with a large daily variation in TL is suggested to reduce the train in monotony and strain therefore having a positive effect on physical status of athletes [22]. The explanation for the observed differences in AS that actually serves as a measure of intensity could be related to specific needs during this week based on the conditioning needs of the squad and/or a to a mesocycle pre-organised periodisation aiming to alter training intensity related variables. The observation regarding the higher values of the RPE in week 6 vs weeks 7, 8 and 9 based on our findings do not seem to be related to increased internal load metrics during this microcycle. As previously mentioned during the whole experimental period in the 9 microcycles no differences were observed for these variables. The only observed difference of lower AS values in week 6 vs weeks 4 and especially week 8 further support this hypotheses since this parameters serves as an indicator of intensity which is related to RPE. Since intensity was not increased amongst the other metrics in weeks 7, 8 and 9 compared to week 6 the observed higher RPE values could more probable associated with other than physiological factors. Renfree., *et al*. [23] reported that RPE can be dissociated and affected from the physiological process through a variety of psychological mechanisms. Furthermore, RPE may be altered by a several factors related with the perception of exercise intensity, and is not is not totally independent from efferent or afferent sensory signals and also this internal performance measure could vary according to the cognitive focus of the player [9]. Lastly, RPE has been found to be subject to personality factors such as extraversion, neuroticism, depression, and anxiety [9]. One possible explanation for the increased RPE values observed it the 6-week microcycle could be related with a possible increased psychological stress created by a defeat in an important match at the end of week 5 and/or the pressure for the outcome of a significant forthcoming competition which could result in a psychologically-induced increase in RPE values.

Playing position

In agreement with the available literature we observed difference in training load metrics according to the playing positions. The major findings was that CFs were the players with more significant differences and the higher overall values observed for external and internal training load metrics i.e. in TDC > than CB and FB; TDC.min^{-1} > than CD; in AS > than FB; in HSR > than CB; in SP > CB and in RPE > than FB. This finding is in accordance with Baptista., *et al*. (2018) reporting that CF is the most physical demanding position with longer distances covered in HIR and sprints. This findings is in contrast to others reporting that wide players (FB and wide middlefielders) compared with more central positions, including CF, cover greater distances in HIR and sprint (Bradley., *et al*. 2009; Dlaen., *et al*. 2016;

Di Mascio M and Bradley PS, 2013). The findings of this study do not support the suggestion that these differences between wide and more central positions are due to a lack of space for reaching sprinting velocity. These findings may be more based around the individual characteristics and imposed coaching demands of these positional players, and also the playing style. For example, these players may be pressurised to play a high pressing style within the training session hence the increased outputs seen within the study. Additionally, these players maybe more explosive in nature which as a result drives the > number of high speed actions and distances rather than being assessed as relative numbers. This finding although not being common in the available literature could be induced by the style of play of the team and the training approach towards this direction within the weekly microcycle [24]. WF were found to be with higher AS and HSR compared to FB and CB respectively which is partly supported by the available literature showing that one of the characteristic of these players is the accumulation of a highspeed activities [4,25]. FB were observed to have of the lowest values in TDC, AS and RPE. This finding is in agreement with a recent study in Elite soccer players [1], however, a recent study in elite Spanish soccer players failed to support this findings reporting that FB produced the greatest load within the microcycle. According to the authors, these metrics were more probable a directed training for those players for simulation the activities such as running the channel and overlapping than other positions used in order to perform adequately under the requirements of the specific 4-3-3 system employed by this soccer team [5]. The authors suggested that these observations are related to the positional profile of these players, characterized by the inclusion of inactivity periods when the ball is on the opposite side of the pitch or out of their zone. Adding to these, and based to our findings we could suggest, in agreement with the available literature [26], that the conditioning stimulus exerted during a weekly microcycle has also a strong positional element.

The findings of this study regarding CD are in agreement with the available literature. Our results showed that in general these players were found with the lower values, some significant (< TDC vs CF; < HSR vs CD; < HSR.min^{-1} vs CF and WF; < SP vs CF and CP, < ED vs CM; < ED.min^{-1}vs CM); and others with a tendency to differ (with the rest of the parameters) in nearly all measured external load metrics (Table 1), apart from the comparison with the FB which is the novel finding of the current study. Indeed, our findings, apart form the observations regarding some lower generally metrics of the FB vs the CD, are comparable with several studies showing that the CD are the players with the lower TDC, shorter intensive activity bouts, and sprint distance compared to other positions [1,27]. This finding can be attributed to the specific needs of the positions these players have to deal with. Of great interest is that the highest values for RPE were observed for CF and CB in this study, that were significant greater compared to FB but also showed a tendency to differ from the other positions. Although this finding can been supported for CFs, having the higher external load metrics during the whole study vs the other positions, this cannot be the case for the CDs. Firstly, no differences were observed in favour of CDs for TDC, TCD.min^{-1}, HIR, AS, compared to the other positions. Secondly, based on these findings, the only other metrics that could have resulted in these observed RPE values could have been the accelerations and the decelerations performed by these players, since these activities are related with increased metabolic cost during training. However, the observed measures of the ED (explosive distance), which is the distance travelled accelerating and decelerating, was of the lowest for the CDs, failing to support the aforementioned hypotheses. A possible explanation for the observed higher RPE values, from a physiological point of view, could be the characteristics of the specific position, with these players being constantly under duels, struggling with opponents for better positions. This could have also been partly accounted for the higher internal load values in the CF, since the position demands of these players i.e. needs of high intensity and maximal actions under a constant duel situation and coping with contact related forces with the opponents, could have resulted in higher metabolic cost and thus physiological fatigue. A latter explanation for these findings for both CF and CD could be related with a greater psychological stress induced-effect in these players due to the fact that their role is related with the most decisive action during a competition, which could hypothetically resulted in these increased internal load values. Interestingly, in general although some similarities were evident with the available literature in the positional analyses of the players [1,5,7], the observed differences observed in the current study could be related to their participation in another league having to follow a different schedule, another training approach, different competition demands, and even culture.

Periodization

Our results regarding microcycle periodization and tapering (the uploading of the players) are in line with the traditional periodization model principles [28]. Our findings revealed variations similar to those of the existing periodization practices [29] targeting to minimize fatigue, to avoid training monotony, and to optimize the physiological adaptations, supporting the goal of periodization to appropriately manipulate training contents to optimise competitive performance [30]. The detailed overall analysis of the weekly microcycles revealed that in this study all metrics decreased progressively and/or showed a tendency to decrease on the days before competition particularly in MD-2 and MD-1. Regarding the MD-1 it was observed to have significantly lower values compared to nearly all the previous days in the examined GPS metrics and RPE values. In particular, there were evident significant lower values of MD-1 compared to MD-4, MD-3 and MD-2 for TDC, AS and RPE, compared to MD-4 and MD-3 for HSR and MD-3 for SP. These findings are comparable with recent evidence revealing a clear tendency for reduction of the external and internal training load in the structured microcycle the day preceding the competition [1,2,31,32] aiming to increase the readiness of the players [1,2].

Apart from the aforementioned difference focusing on the MD-1, variations in training load was evident also between the other days of the microcycle. More specifically for TDC and RPE our data revealed the following pattern of significant differences MD-4 < MD-3 > MD-2 > MD-1. HSR followed a similar pattern of significant differences showing an increase from MD-4 to MD-3 and then decrease towards MD-2 (MD-4 < MD-3 > MD-2) with no difference between MD-2 and MD-1. Regarding SP the obtained values showed that only in MD-3 this training load parameter was significantly higher compared to all the other days. Lastly, regarding AS the only difference observed was between al three MD-4, MD-3, and MD-2 compared to MD-1. In general these finding provide supporting evidence to the observations that training load shows a clear tendency of reduction on the training days closer to the forthcoming competition [6]. Although our findings regarding both external and internal load values are comparable with other studies showing similar periodization behaviours [1,31,32] others have failed to observe any different in GPS metrics and RPE during the MD-4, MD-3 and MD-2 within a structured microcycle [2]. This discrepancy in the literature could be the result of different approaches in the structure of the weekly training microcycle. Lastly, it should be mentioned that according to our findings, in line with the periodization and tapering principles within the weekly microcycle MD-3 and MD-4 where the most intense sessions. In these two sessions players had the higher training load values in general, targeting to specific training adaptations [33].

Conclusion

To conclude, the current investigation confirms the use of a tapering strategy within the professional Chinese Superleague team. This study demonstrates the employment of the proposed training periodisation and tapering strategies/guidelines based on the available literature guidelines, aiming to maximize performance capacity during competition. Our study provides further supporting evidence to the limited literature regarding the quantification of the weekly microcycle training sessions, demonstrating various playing position demands within these sessions and highlighting the necessity for positional conditioning requirements. Finally, this investigation has shown how it is possible to maintain a structured tapering microcycle strategy whilst inducing daily physical outputs but without causing significant fluctuations in the weekly TLs. Furthermore, the investigation has also provided a tapering approach that may induce the significant variation of the positional demands, assisting also with the decoding of the individual conditioning needs of the players.

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