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Application of a Structured Training Plan on Different-Length Microcycles in Soccer—Internal and External Load Analysis between Training Weeks and Games

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Abstract: The aim of this study was to apply a training plan to four different-length microcycles (MIC) in soccer and analyze (a) the load within the training weeks and (b) the short-term effect on the matches that were played at the end of each microcycle. An intervention training program applied to microcycles of five, six, seven and nine days during two seasons of the Cypriot Fist Division. The GPS technology and subjective (wellness, RPE) assessments were used to monitor the load throughout trainings and games. In weekly external load, there were differences between the four microcycles, with a lower load in MIC5 for all the parameters and higher on MIC9 in the most of them ($p < 0.05$). In RPE, MIC9 (229 ± 60 arbitrary units (au)) differed significantly from MIC5 (229 ± 60 au, $p < 0.001$), MIC6 (281 ± 67 au; $p < 0.001$) and MIC7 (297 ± 48 au, $p = 0.009$). MIC5 also differed from MIC6 ($p = 0.001$) and MIC7 ($p < 0.001$). In the game external load, the only differences found in GDEC2 (game decelerations) were between MIC7 (68 ± 10 number (n)), MIC5 (61 ± 11 n, $p = 0.035$) and MIC6 (60 ± 10 n, $p = 0.002$); in GSPEF (game speed efforts), between MIC5 (40 ± 17 n), MIC7 (48 ± 14 n, $p = 0.004$) and MIC9 (48 ± 16 n, $p < 0.001$) and between MIC6 (41 ± 14 n), MIC7 ($p = 0.009$), and MIC9 ($p = 0.009$); in GMPW5 (game metabolic power efforts), between MIC7 (1307 ± 271 n), MIC5 (1201 ± 340 n, $p = 0.035$) and MIC6 (1178 ± 261 n, $p = 0.001$). No differences were found for wellness and perceived exertion. It is important for performance coaches to adapt the training load to the length of the microcycle, applying a lower load to short training weeks and manage the load fluctuation on long training weeks in terms of volume, intensity and recovery. In our study, the results confirmed that this strategy could result in similar performance in the games, regardless of microcycle length.

Keywords: GPS; external load; internal load; football; game running performance

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1. Introduction

In the past decades, almost all the professional football teams were using electronic performance tracking systems to monitor the players' load. This information is very important for sports scientists and conditioning coaches to better understand the volume and intensity during the training sessions and the official matches [1,2]. Training load monitoring is fundamental for training planning and periodization for several reasons: (a) to avoid undertraining or overtraining, (b) to reduce the risk of injury and (c) to have the optimal physical condition to compete [3]. In this regard, the aim of strength and conditioning coaches is to find the right balance of the player training load [4].

The training load can be divided into "internal" and "external". Heart rate training impulse (TRIPM) and session rate of perceived exertion (s-RPE) are the common methods to describe the internal load [5]. On the other hand, the external load consists of parameters related to the players' movement on the field (distance covered in different speed zones, accelerations, decelerations, sprint actions, etc.) and can be captured through GPS or video-based technologies [6].

Monitoring the wellness status of athletes allows us to know the details of fatigue, stress and delayed onset muscle soreness (DOMS) [7]. The Hooper index [8] assesses these variables (plus "sleep quality"), which are associated with biochemical (physical and physiological) and biomechanical stress responses [7]. The s-RPE is proven to be valid, reliable and has correlation with the heart training zones [9], but it is not sensitive to the subjective perceptions of fatigue, DOMS or stress [10] that can be assesses with the Hooper index [8]. Past research has found no association between the Hooper index and RPE [10]. Interestingly, Clemente et al. (2017) [11] found that during the weeks with two matches, the correlation was small-to-moderate (negative), but there was no correlation during the weeks with only one match. In another study, it was reported that on the first day after match (MD + 1), s-RPE showed a lower value in comparison with all the other match days, but the Hooper index had a higher value because of the fatigue from the preceding game [12]. From the above findings, we suggest using the Hooper and s-RPE methods and reading their results independently according to the week format or the days of the week.

During the training days of the week, the workload varies in professional soccer players. After the recovery days, the training load increased progressively until three days before the next match (MD − 3) and later decreased down to MD − 1 [4,12–15]. Specifically, it was found that on MD − 4 and MD − 3, the workload was greater than on MD − 2 and MD − 1 [4,14,15], and these days are the most suitable to load the players through repeated high-intensity actions, drills undertaken on larger pitch sizes and small-sided games [4,14,16]. Malone at el. (2015) [17] found that the total load remained similar during training days, except for MD − 1, and Owen et al. (2017) [18] reported that training load variables including s-RPE were elevated on MD − 3 compared with MD − 4, −2 and −1. Similarly, in another study, significantly lower values for all the training load variables (total distance, average speed and high-speed running distance) appeared on MD−1 [12]. The loading strategy is different for the players who do not participate (or play less than 45 min in the last game), for them, an additional demanding day is MD + 1 [13]. All the above confirms the tapering strategy which is adopted by strength and conditioning coaches to decrease the stress of training and maximize performance on the match day [19].

The weekly workload should be adjusted to achieve the desired results. To win matches, it is necessary to optimally load the players during the training days (high-speed running distance (HSRD) and s-RPE) but not give them the highest load because this could lead to negative results [12,20]. At the same time, other studies suggest that the players should be trained with high intensity to cope with the most intense periods of the match (worst case scenarios); therefore, the strength and conditioning coaches ought to design their training drills to replicate these periods [2,21–24] but should avoid excessive accumulated fatigue that can affect the match outcome [12].

The microcycle length in football usually varies depending on the competitive calendar [24,25]. Nevertheless, similar periodization load strategies are applied (load on the middle days and unload on MD − 2 and MD − 1) [14,26].

The length of the microcycle may have an impact on the load of soccer players [13,24,27,28]. Recent studies showed that the training load increased with longer microcycles [25,28]. In their research, Oliva-Lozano et al. (2022) [13] found that a weekly load in long microcycles was greater than that in regular and short microcycles, not only in volume but also in the intensity (except for relatively high-intensity accelerations > 3 m/s^2 (ACC_{HIGH}), high-intensity decelerations < −3 m/s^2 (DEC_{HIGH}) and high metabolic load (HML)). Similarly, Clemente et al. (2019) [28] found that weeks with five training sessions had increased values for all external load ratios than weeks with three or four sessions. Stevens et al.

(2017) [14] found that the weekly load (4 training sessions) represented a load equal to 3.1, 3.9 and 3.3 for total distance, accelerations and decelerations, respectively, but running distance (14.4–19.8 km·h^{-1}) and HSR (>19.8 km·h^{-1}) had relatively lower values (2.5 and 2.1, respectively). From another study [28], the ratios for the total distance, player load and total number of high accelerations and decelerations during the three-training-session week were 1.8 ± 0.6, 2.0 ± 0.6, 2.2 ± 1.8 and 1.6 ± 0.9, respectively, and in the five-training-session week 3.5 ± 1.3, 3.8 ± 1.6, 4.1 ± 1.6 and 3.4 ± 1.9, respectively. However, for running distance (14.0–19.9 km·h^{-1}) and high-speed running distance (20.0–24.9 km·h^{-1}), these values were 1.2 ± 0.7 and 1.1 ± 0.8, respectively, in the three-training-session week and 2.3 ± 1.3 and 2.3 ± 1.5, respectively, in the five-training-session week.

Observing all these different loading approaches, it is interesting to further investigate the relation of a weekly load to the game demands. According to Clemente et al. (2019) [28], there were trivial-to-small correlation between the weekly training load and match demand. Thus, training is independent of the dynamics of the next match. Other studies found that the game result is dependent on the number of training sessions during the preceding week [29] and the training load on specific days in the microcycle [12]. To avoid the negative effects of accumulated load, the priority during short microcycles is to recover from the previous game and focus on the development of soccer skills rather than on strength and conditioning [29]. This is an acceptable approach, but coaches adapt different training methodologies [30]. Therefore, it is necessary to further identify the data on what drill types can be used on specific days to balance the load [28], and what microcycle model should be applied, because in previous studies the patterns were different [12].

The aim of this study was to apply a training plan to four different-length microcycles (MIC) in soccer and analyze (a) the load within the training weeks and (b) the short-term effect on the matches that were played at the end of each microcycle. The durations of the microcycles studied for two years in a professional soccer team were 5 days (MIC5), 6 days (MIC6), 7 days (MIC7) and 9 days (MIC9). We assumed that the longer the duration of the MIC, the greater the load (internal and external) that the players will be burdened with. We also hypothesized that longer MICs would lead to a decrease in the game running performance and internal load.

2. Materials and Methods

2.1. Study Design

The data were collected from a professional football team of the Cypriot First Division, during the seasons 2021–2023. This study took place during the competition period. All the training weeks were monitored, but only data fulfilling the following criteria were analyzed: (a) official game weeks, (b) week duration 5, 6, 7, 9 days (as described in the following paragraph), (c) only data of players who played more than 60′ at the previous and the following game and (d) only data of players who participated in all the training sessions. Finally, the subjects were 44 football players (age 25.7 ± 4, height 177.7 ± 6.7 cm, body mass 74.6 ± 7.7 kg, fat mass 7.3 ± 2.2% and BMI 20.7 ± 8.2).

2.2. Weeks Format

The model «MD±» [17] was used to describe the training days during each microcycle. Our suggestion is to use the "+" symbol for the first two days (recovery content) and then the "−" symbol to better discriminate between the load fluctuations during the week: recovery—load—tapering [17,27,31]. The microcycles' format was as follow: 5 days (MIC5)—MD + 1 off, MD + 2, MD − 2 and MD − 1 trainings (6 weeks); 6 days (MIC6)— MD + 1 off, MD + 2, MD − 3, MD − 2 and MD − 1 trainings (7 weeks); 7 days (MIC7)—MD + 1 off, MD + 2, MD − 4, MD − 3, MD − 2 and MD − 1 trainings (7 weeks); 9 days (MIC9)—MD + 1 and MD + 2 off, MD − 5, MD − 4, MD − 4, MD − 3, MD − 2 and MD − 1 trainings (5 weeks); MD + 2 always consisted of light regeneration—activation training for the players who played more than >60′ in the previous game.

2.3. Training Plan

In MIC5, the main target was the physical recovery from the last game and tactical preparation for the following game. In MIC6, physical training was applied only on MD − 3. Specifically, small-sided games were used to stimulate cardiovascular and neuromuscular responses but in a reduced field size to avoid overloading the players [32]. In MIC7 and MIC9, after recovery days (MD + 1, MD + 2), the physical target of the first day was reaching maximal speed and load in HSR. To comply with this, the tactical drills took place in a relatively large area. Furthermore, the integration of SSG, MSG and LSG stimulated in the players in position specific physiological and tactical demands [33–36]. MD − 3 in MIC7 and MIC9 was the same as in MIC6. In MIC9, the day between high-demand trainings (MD − 4) had a reduced load for the players to recover from the previous day. Finally, on MD − 2 and MD − 1, the training content was the same in all the microcycles. In Table 1, you can find the training plan for each microcycle.

Table 1. The training content for the different-duration microcycles. MIC5 = five-day microcycle, MIC6 = six-day microcycle, MIC7 = seven-day microcycle, MIC9 = nine-day microcycle. MD + 2 = match day +2, MD − 6 = match day −6, MD−5 = match day −5, MD − 4 = match day −4, MD − 3 = match day −3, MD − 2 = match day −2, MD − 1 = match day −1.

MIC5—Day off 1st Day				
MD + 2	**MD − 2**	**MD − 1**		
Running, mobility exercises, 10′	Dynamic warm up, 10′	Dynamic warm up, 10′		
Passing drills or rondo, 15′	Passing drills or small rondo, 20′	Coordination, acceleration, reaction drills, 10′		
Tactical content, 10′	Tactical content, 20′	Tactical content, 20′		
Tactical game 10v10 + 2 GK in reduced space (100–120 m^2/player), 10′	Tactical game 10v10 + 2 GK in reduced space (150–180 m^2/player), 10′	Tactical game 10v10 + 2 GK in reduced space (110—140 m^2/player), 15′		
MIC6—Day off 1st day				
MD + 2	**MD − 3**	**MD − 2**	**MD − 1**	
Running, mobility exercises, 10′	Dynamic warm up, coordination drills, 20′	Dynamic warm up, 10′	Dynamic warm up, 10′	
Passing drills or rondo, 15′	Passing drills or small rondo, 20′	Passing drills or small rondo, 20′	Coordination, acceleration, reaction drills, 10′	
Tactical content, 10′	Tactical content, 20′	Tactical content, 20′	Tactical content, 20′	
Tactical game 10v10 + 2 GK in reduced space (100–120 m^2/player), 10′	Physical content: small side games 3v3 – 5v5 + GK (110–120 m^2/player), 20′	Tactical game 10v10 + 2 GK in reduced space (150–180 m^2/player), 10′	Tactical game 10v10 + 2 GK in reduced space (110–140 m^2/player), 15′	
MIC7—Day off 1st day				
MD + 2	**MD − 4**	**MD − 3**	**MD − 2**	**MD − 1**
Running, mobility exercises, 10′	Resistance training in the gym (power, emphasized on speed or max load)	Dynamic warm up, coordination drills, 20′	Dynamic warm up, 10′	Dynamic warm up, 10′
Passing drills or rondo, 15′	Dynamic activation, coordination drills, 10′	Passing drills or small rondo, 20′	Passing drills or small rondo, 20′	Coordination, acceleration, reaction drills, 10′
Tactical content, 10′	Maximal speed drills, 10′	Tactical content or game, medium space (135–160 m^2/player)	Tactical content, 20′	Tactical content, 20′
Tactical game 10v10 + 2 GK in reduced space (100–120 m^2/player), 10′	Tactical content: large space, usually transition drills or game (195–260 m^2/player), 20′	Physical content: small side games 3v3 – 5v5 + GK (110–120 m^2/player), 20′	Tactical game 10v10 + 2 GK in reduced space (150–180 m^2/player), 10′	Tactical game 10v10 + 2 GK in reduced space (110–140 m^2/player), 15′
	Large side game 10v10 +2 GK (195–260 m^2/player), 15′			

Table 1. *Cont.*

MIC9—Day off 1st and 2nd Day					
MD − 6	**MD − 5**	**MD − 4**	**MD − 3**	**MD − 2**	**MD − 1**
Running, mobility exercises, 10′	Resistance training in the gym (power, emphasized on speed or max load)	Running, mobility exercises, 10′	Dynamic warm up, coordination drills, 20′	Dynamic warm up, 10′	Dynamic warm up, 10′
Passing drills or rondo, 20′	Dynamic activation, coordination drills, 10′	Passing drills or rondo, 10′	Passing drills or small rondo, 20′	Passing drills or small rondo, 20′	Coordination, acceleration, reaction drills, 10′
Tactical content, 15′	Maximal speed drills, 10′	Tactical content or game 10v10 + 2 GK in reduced space (100–120 m^2/player), 20′	Tactical content or game, medium space (135–160 m^2/player)	Tactical content, 20′	Tactical content, 20′
Tactical game 10v10 + 2 GK in reduced space (100–120 m^2/player), 15′	Tactical content: large space, usually transition drills or game (195–260 m^2/player), 20′		Physical content: small side games 3v3–5v5 + GK (110–120 m^2/player), 20′	Tactical game 10v10 + 2 GK in reduced space (150–180 m^2/player), 10′	Tactical game 10v10 + 2 GK in reduced space (110–140 m^2/player), 15′
	Large side game 10v10 + 2 GK (195–260 m^2/player), 15′				

GK: goalkeeper.

2.4. Data Collection

Subjective data: the staff collected subjective wellness data (Hooper questionnaire) every morning. Players were to respond to four questions: "sleep quality" (SLEEP), "muscle soreness" (SORENESS), "fatigue" (FATIGUE) and "stress" (STRESS), rating their responses on a Likert scale (1–7). After the training, subjective score of perceived exertion (RPE) was collected using a 0 to 10 scale [7,9]. This value then was multiplied by the training duration to quantify the subjective training load (s-RPE) [9]. External load data: during trainings and games, the GPEXE global positioning system (18 Hz, GPEXE, Exelio srl, Udine, Italy) was used to collect the external load data. The players wore a sports vest with a pocket on the back (between the scapulae) where the devices were placed. This equipment was used in the past by other authors and validated as reliable to determine movement patterns [37]. The following variables were assessed: number of accelerations of 2–3 m/s^2 (ACC2), number of high accelerations >3 m/s^2 (ACC3), number of decelerations of -2–-3 m/s^2 (DEC2), number of high decelerations <-3 m/s^2, total distance (DIST), distance in speed zone of 14.4–19.7 km/h (DIS4), distance in speed zone of 19.8–25.2 km/h (DIS5), distance in speed zone >25.2 km/h (DIS6), number of speed efforts at 19.8 km/h (SPEF), metabolic power distance at 15–25.5 w/kg (MPW4), metabolic power distance at 25.5–50 w/kg (MPW5), metabolic power distance at >50 w/kg (MPW6), number of metabolic power efforts at >25.5 w/kg (MPWEF).

2.5. Statistical Analysis

Data are presented as mean ±SD. The normal distribution of each variable of the sample was checked with the Shapiro–Wilk test, and confirmation of the normal distribution allowed us to use parametric statistical methods. Where there was no normal distribution, the Mann–Whitney U test was performed for independent samples. The one-way repeated measures variance analysis was performed for dependent measurements (4 samples—different microcycles) for a dependent factor (time). Where a statistically significant effect was found, the test for multiple LSD comparisons was performed. This analysis was performed to find the differences between the loads of microcycles and between the matches played at the end of the microcycles. The level of significance was set at $p < 0.05$. The SPSS version 28.0 was used for all analyses (SPSS, Inc., Chicago, IL, USA).

3. Results

3.1. Weekly Average Load

ACC2 was 25.35 ± 6.49, 29.76 ± 5.05, 33.51 ± 3.77 and 38.11 ± 7.14 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 17.610, $p < 0.001$, $\eta^2 = 0.595$) between MIC5 and MIC6 ($p = 0.016$), MIC7 ($p < 0.001$) and MIC9 ($p < 0.001$), between MIC6 and MIC7 ($p = 0.005$) and MIC9 ($p < 0.001$) and between MIC7 and MIC9 ($p = 0.022$). ACC3 was 5.82 ± 3.27, 6.93 ± 3.94, 7.56 ± 3.68 and 9.24 ± 6.34 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 5.505, $p = 0.003$, $\eta^2 = 0.314$) between MIC5 and MIC7 ($p = 0.43$) and MIC9 ($p = 0.02$) and between MIC6 and MIC9 ($p = 0.28$).

DEC2 was 19.84 ± 4.28, 24.15 ± 5.30, 27.44 ± 5.85 and 30.35 ± 7.83 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 21.109, $p < 0.001$, $\eta^2 = 0.638$) between MIC5 and MIC6 ($p = 0.003$), MIC7 ($p < 0.001$) and MIC9 ($p < 0.001$), between MIC6 and MIC7 ($p = 0.031$) and MIC9 ($p = 0.001$) and between MIC7 and MIC9 ($p = 0.034$). DEC3 was 6.09 ± 4.00, 6.93 ± 4.31, 7.40 ± 4.52 and 8.46 ± 6.12 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 3.957, $p = 0.015$, $\eta^2 = 0.248$) between MIC5 and MIC9 ($p = 0.32$). The results are presented in Figure 1.

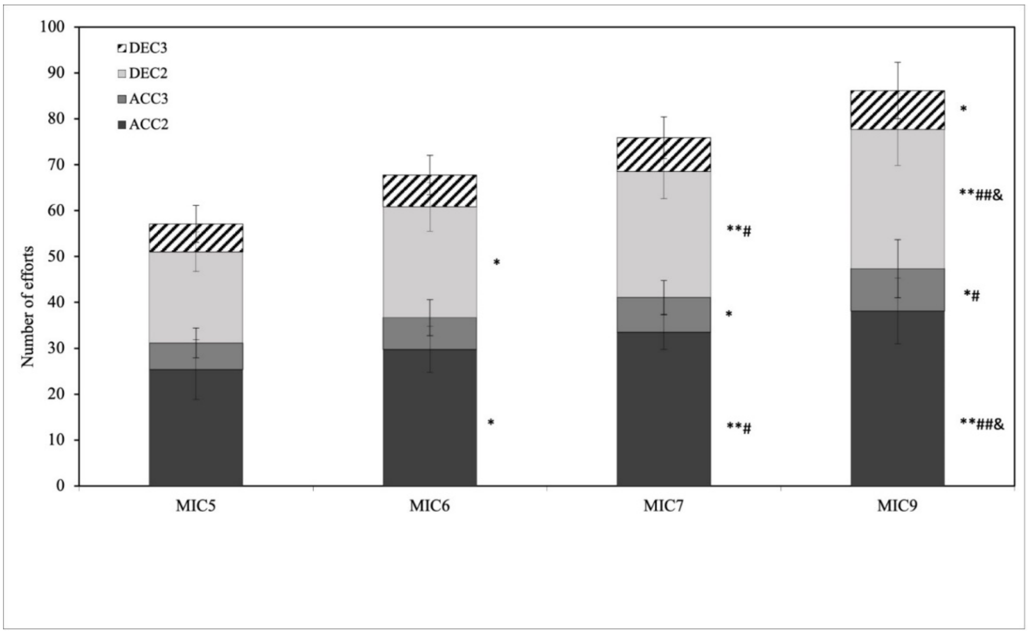

Figure 1. Weekly average values for ACC2, ACC3, DEC2 and DEC3. ACC2 = number of accelerations of 2–3 m/s/s, ACC3 = number of accelerations >3 m/s/s, DEC2 = number of decelerations of −2––3 m/s/s, DEC3 = number of decelerations <−3 m/s/s; MIC5 = five-day microcycle, MIC6 = six-day microcycle, MIC7 = seven-day microcycle, MIC9 = nine-day microcycle; * difference from MIC5, $p < 0.05$; ** difference from MIC5, $p < 0.001$; # difference from MIC6, $p < 0.05$; ## difference from MIC6, $p < 0.05$; & difference from MIC7, $p < 0.05$. Error bars are 95% confidence limits.

DIST was 3691.78 ± 340.73, 4027.17 ± 367.58, 4192.63 ± 320.21 and 4332.27 ± 320.00 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 14.435, $p < 0.001$, $\eta^2 = 0.546$) between MIC5 and MIC6 ($p < 0.001$), MIC7 ($p < 0.001$) and MIC9 ($p < 0.001$) and between MIC6 and MIC9 ($p = 0.03$). DIS4 was 205.37 ± 166.66, 366.79 ± 84.01, 334.04 ± 120.82 and 309.09 ± 69.33 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 11.206, $p < 0.001$, $\eta^2 = 0.483$) between MIC5 and MIC6 ($p = 0.001$), MIC7 ($p < 0.001$) and MIC9 ($p = 0.023$) and between MIC6 and MIC9 ($p = 0.002$). DIS5 was 55.96 ± 55.79, 102.77 ± 52.92, 99.30 ± 39.45 and 93.75 ± 36.92 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 5.883, $p = 0.002$, $\eta^2 = 0.329$) between MIC5 and MIC6 ($p = 0.013$), MIC7

(p = 0.003) and MIC9 (p = 0.028). DIS6 was 8.24 ± 10.49, 11.10 ± 6.40, 21.44 ± 11.31 and 22.92 ± 8.12 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 22.305, p < 0.001, η^2 = 0.650) between MIC5 and MIC7 (p < 0.001) and MIC9 (p < 0.001) and between MIC6 and MIC7 (p = 0.002) and MIC9 (p < 0.001). The results are presented in Figure 2.

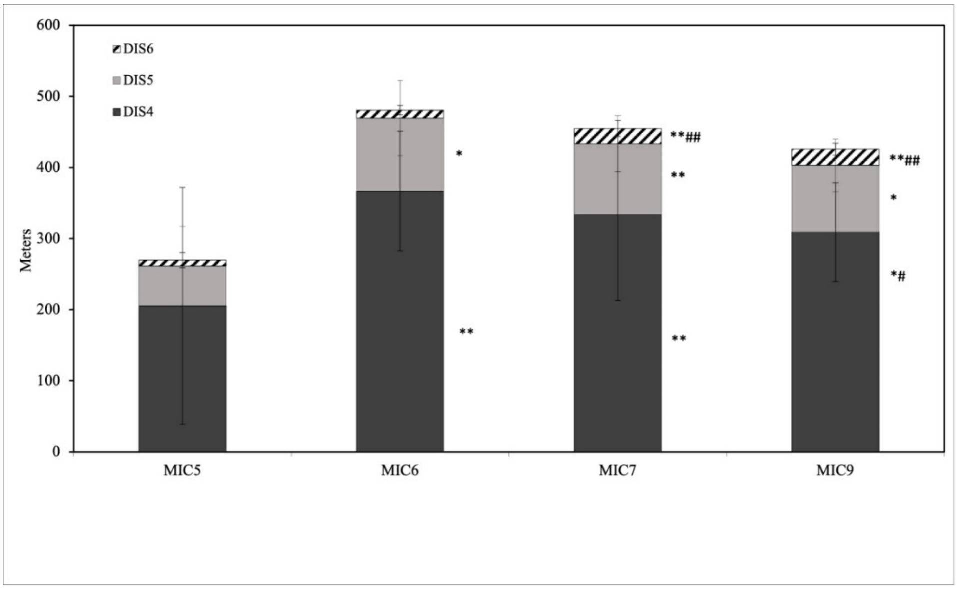

Figure 2. Weekly average values for DIS4, DIS5 and DIS6. DIS4 = distance covered at a speed of 14.4–19.8 km/h, DIS4 = distance covered at a speed of 19.8–25.2 km/h, DIS4 = distance covered at a speed >25.2 km/h; MIC5 = five-day microcycle, MIC6 = six-day microcycle, MIC7 = seven-day microcycle, MIC9 = nine-day microcycle; * difference from MIC5, p < 0.05; ** difference from MIC5, p < 0.001; # difference from MIC6, p < 0.05. ## difference from MIC6, p < 0.001. Error bars are 95% confidence limits.

Metabolic power distance (MPW4) was 486.44 ± 72.37, 519.52 ± 76.74, 563.48 ± 110.35 and 553.05 ± 109.75 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 2.924, p = 0.047, η^2 = 0.196) between MIC5 and MIC7 (p = 0.009) and a marginal difference between MIC5 and MIC9 (p = 0.064). MPW5 was 289.47 ± 56.69, 340.73 ± 74.82, 371.35 ± 75.44 and, 389.19 ± 111.94 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 7.451, p < 0.001, η^2 = 0.383) between MIC5 and MIC6 (p = 0.006), MIC7 (p < 0.001) and MIC9 (p = 0.007). MPW6 was 64.63 ± 18.84, 81.44 ± 29.73, 95.61 ± 25.09 and 107.70 ± 43.64 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 12.589, p < 0.001, η^2 = 0.512) between MIC5 and MIC6 (p = 0.018), MIC7 (p < 0.001) and MIC9 (p = 0.002) and between MIC6 and MIC7 (p = 0.013) and MIC9 (p = 0.005). The results are presented in Figure 3.

The values for speed efforts (SPEF) were 8.17 ± 3.52, 9.94 ± 4.39, 11.76 ± 3.80 and 12.85 ± 5.52 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 9.156, p < 0.001, η^2 = 0.433) between MIC5 and MIC6 (p = 0.021), MIC7 (p < 0.001) and MIC9 (p = 0.007) and between MIC6 and MIC7 (p = 0.021) and MIC9 (p = 0.02). MPWEF was 54.21 ± 16.13, 62.95 ± 19.60, 70.48 ± 19.32 and 78.94 ± 34.42 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 11.755, p < 0.001, η^2 = 0.495) between MIC5 and MIC6 (p = 0.006), MIC7 (p < 0.001) and MIC9 (p = 0.002) and between MIC6 and MIC7 (p = 0.01) and MIC9 (p = 0.012).

SLEEP was 2.82 ± 1.11, 2.58 ± 0.90, 2.49 ± 0.82 and 2.53 ± 0.81 for MIC5, MIC6, MIC7 and MIC9, respectively. For MIC5, the value was higher, but there was no significant difference from the other weeks. SORENESS was 2.77 ± 0.79, 2.28 ± 0.35, 2.30 ± 0.45 and 2.11 ± 0.61 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 1.038, p = 0.019, η^2 = 0.238) between MIC5 and MIC7 (p = 0.037) and MIC9

(p = 0.025). FATIGUE was 2.90 ± 0.76, 2.50 ± 0.38, 2.64 ± 0.54 and 2.47 ± 0.41 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 2.915, p = 0.047, η^2 = 0.195) between MIC5 and MIC9 (p = 0.037). STRESS was 2.01 ± 1.05, 1.54 ± 0.60, 1.59 ± 0.63 and 1.29 ± 0.36 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 4.241, p = 0.012, η^2 = 0.261) between MIC5 and MIC6 (p = 0.048) and MIC9 (p = 0.037). Marginally, there was no difference between MIC5 and MIC7 (p = 0.058). The results are presented in Figure 4.

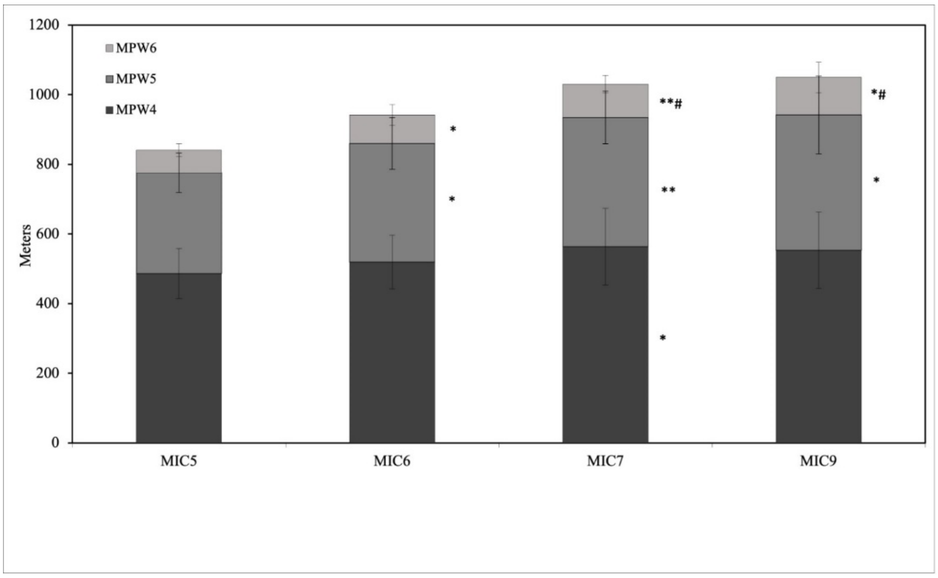

Figure 3. Weekly average values for MPW4, MPW5 and MPW6. MPW4 = distance covered with a metabolic power of 15.5–25.5 w/kg, MPW5 = distance covered with a metabolic power of 25.5–50 w/kg, MPW6 = distance covered with a metabolic power of >50 w/kg; MIC5 = five-day microcycle, MIC6 = six-day microcycle, MIC7 = seven-day microcycle, MIC9 = nine-day microcycle; * difference from MIC5, $p < 0.05$; ** difference from MIC5, $p < 0.001$; # difference from MIC6, $p < 0.05$. Error bars are 95% confidence limits.

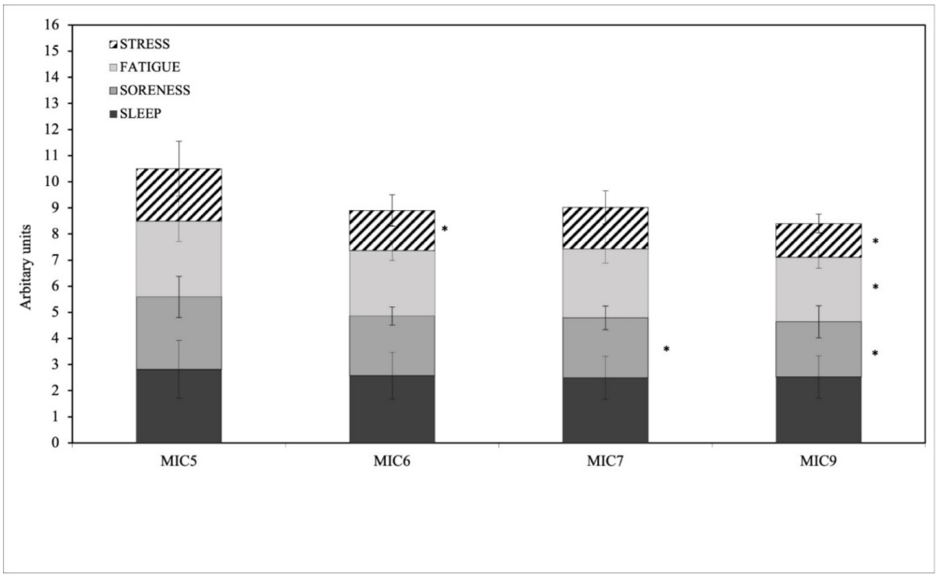

Figure 4. Wellness score average values. SLEEP = sleep responses, SORENESS = muscle soreness responses, FATIGUE = fatigue responses, STRESS = stress responses; MIC5 = five-day microcycle, MIC6 = six-day microcycle, MIC7 = seven-day microcycle, MIC9 = nine-day microcycle; * difference from MIC5, $p < 0.05$. Error bars are 95% confidence limits.

The s-RPE values were 228.85 ± 59.39, 281.33 ± 66.89, 297.91 ± 48.48 and 334.35 ± 36.20 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 24.345, $p < 0.001$, η^2 = 0.670) between MIC5 and MIC6 (p = 0.001), MIC7 ($p < 0.001$) and MIC9 ($p < 0.001$), between MIC6 and MIC9 ($p < 0.001$) and between MIC7 and MIC9 (p = 0.009).

3.2. Games Average Load

GACC2 was 70.68 ± 17.08, 65.45 ± 10.03, 71.11 ± 9.93 and 69.59 ± 13.01 for MIC5, MIC6, MIC7 and MIC9, respectively. There was no significant difference ($F_{(3,36)}$ = 1.560, p = 0.216, η^2 = 0.115). GACC3 was 15.81 ± 11.05, 14.67 ± 9.13, 16.01 ± 9.58 and 17.10 ± 10.71 for MIC5, MIC6, MIC7 and MIC9, respectively. There was no significant difference ($F_{(3,36)}$ = 1.582, p = 0.211, η^2 = 0.116). GDEC2 was 60.69 ± 11.22, 60.34 ± 10.26, 67.68 ± 10.30 and 66.26 ± 16.15 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 2.917, p = 0.047, η^2 = 0.196) between MIC5 and MIC7 (p = 0.035) and between MIC6 and MIC7 (p = 0.002). GDEC3 was 24.51 ± 13.37, 23.64 ± 12.69, 26.40 ± 12.72 and 26.37 ± 14.04 for MIC5, MIC6, MIC7 and MIC9, respectively. The values for MIC7 and MIC9 were higher but without a significant difference ($F_{(3,36)}$ = 1.884, p = 0.150, η^2 = 0.136). The results are presented in Figure 5.

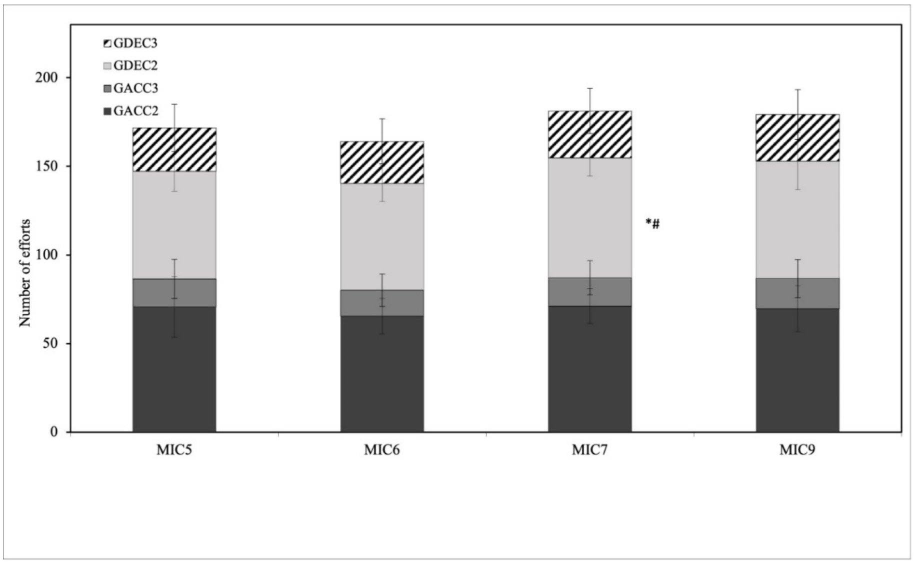

Figure 5. Average values for GACC2, GACC3, GDEC2 and GDEC3 during the games that were played at the end of the microcycles. GACC2 = number of accelerations of 2–3 m/s/s, GACC3 = number of accelerations >3 m/s/s, GDEC2 = number of decelerations of −2–−3 m/s/s, GDEC3 = number of decelerations <−3 m/s/s; MIC5 = five-day microcycle, MIC6 = six-day microcycle, MIC7 = seven-day microcycle, MIC9 = nine-day microcycle; * difference from MIC5, $p < 0.05$; # difference from MIC6, $p < 0.05$. Error bars are 95% confidence limits.

GDIST was 10,122.54 ± 887.14, 9754.76 ± 795.48, 10,070.39 ± 736.88 and 9799.97 ± 863.37 for MIC5, MIC6, MIC7 and MIC9, respectively. There was no significant difference ($F_{(3,36)}$ = 1.282, p = 0.295, η^2 = 0.097).

GDIS4 was 1375.27 ± 336.47, 1345.81 ± 314.09, 1247.22 ± 328.97 and 1379.36 ± 340.17 for MIC5, MIC6, MIC7 and MIC9, respectively. There was no significant difference ($F_{(3,36)}$ = 0.776, p = 0.515, η^2 = 0.061). GDIS5 was 485.28 ± 244.88, 496.04 ± 177.73, 472.37 ± 155.74 and 532.35 ± 179.27 for MIC5, MIC6, MIC7 and MIC9, respectively. There was no significant difference ($F_{(3,36)}$ = 0.821, p = 0.491, η^2 = 0.064). GDIS6 was 117.50 ± 63.75, 137.58 ± 82.72, 151.40 ± 71.38 and 141.08 ± 99.75 for MIC5, MIC6, MIC7 and MIC9, respectively. There was no significant difference ($F_{(3,36)}$ = 1.020, p = 0.393, η^2 = 0.078). The results are presented in Figure 6.

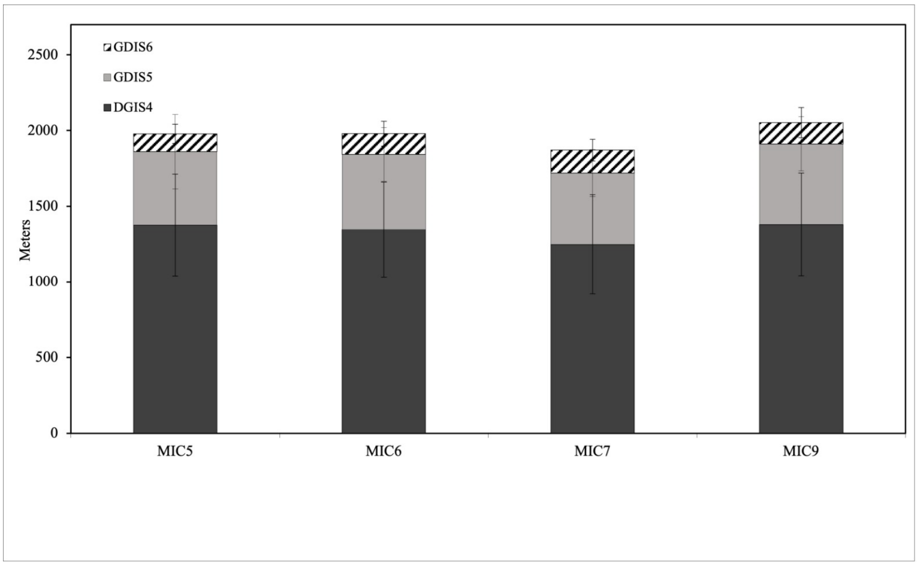

Figure 6. Average values for GDIS4, GDIS5 and GDIS6 during the games that were played at the end of the microcycles. GDIS4 = distance covered at a speed of 14.4–19.8 km/h, GDIS4 = distance covered at a speed of 19.8–25.2 km/h, GDIS4 = distance covered at a speed >25.2 km/h; MIC5 = five-day microcycle, MIC6 = six-day microcycle, MIC7 = seven-day microcycle, MIC9 = nine-day microcycle. Error bars are 95% confidence limits.

GSPEF was 40.37 ± 16.65, 41.25 ± 13.60, 47.58 ± 13.72 and 47.65 ± 15.98 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 8.049, $p < 0.001$, η^2 = 0.401) between MIC5 and MIC7 (p = 0.004), between MIC5 and MIC9 ($p < 0.001$), between MIC6 and MIC7 (p = 0.009) and between MIC6 and MIC9 (p = 0.009).

GMPWEF was 185.13 ± 66.50, 171.61 ± 54.80, 184.71 ± 60.67 and 180.65 ± 73.66 for MIC5, MIC6, MIC7 and MIC9, respectively. There was no significant difference ($F_{(3,36)}$ = 2.414, p = 0.083, η^2 = 0.167).

GMPW4 was 2025.59 ± 304.48, 1948.76 ± 310.94, 2035.74 ± 277.08 and 1919.13 ± 310.53 for MIC5, MIC6, MIC7 and MIC9, respectively. There was no significant difference ($F_{(3,36)}$ = 0.799, p = 0.503, η^2 = 0.062). GMPW5 was 1201.26 ± 340.02, 1178.44 ± 260.60, 1306.87 ± 270.50 and 1220.52 ± 312.99 for MIC5, MIC6, MIC7 and MIC9, respectively. There was a significant difference ($F_{(3,36)}$ = 3.095, p = 0.039, η^2 = 0.205) between MIC5 and MIC7 (p = 0.035) and between MIC6 and MIC7 (p = 0.001). GMPW6 was 296.27 ± 108.33, 288.82 ± 93.52, 324.09 ± 99.44 and 312.40 ± 109.48 for MIC5, MIC6, MIC7 and MIC9, respectively. There was no significant difference ($F_{(3,36)}$ = 1.779, p = 0.169, η^2 = 0.129). The results are presented in Figure 7.

GSLEEP was 3.05 ± 1.22, 2.96 ± 0.73, 2.39 ± 0.83 and 2.64 ± 0.95 for MIC5, MIC6, MIC7 and MIC9, respectively. This parameter had lower values for MIC7 and MIC9 but without a significant difference ($F_{(3,51)}$ = 2.360, p = 0.082, η^2 = 0.122). GSORENESS was 3.99 ± 0.86, 4.07 ± 0.94, 4.48 ± 1.23 and 3.47 ± 1.01 for MIC5, MIC6, MIC7 and MIC9, respectively. This parameter had lower values for MIC6 and MIC7 but without a significant difference ($F_{(3,51)}$ = 2.161, p = 0.104, η^2 = 0.113). GFATIGUE was 3.94 ± 0.7, 3.86 ± 0.95, 3.54 ± 1.7 and 3.59 ± 1.14 for MIC5, MIC6, MIC7 and MIC9, respectively. This parameter had lower values for MIC7 but without a significant difference ($F_{(3,49)}$ = 0.641, p = 0.592, η^2 = 0.036). GSTRESS was 2.62 ± 0.67, 2.42 ± 0.43, 2.39 ± 1.04 and 2.24 ± 0.59 for MIC5, MIC6, MIC7 and MIC9, respectively. There was no significant difference ($F_{(3,49)}$ = 0.849, p = 0.44, η^2 = 0.048).

The s-RPE values were 781.45 ± 99.55, 767.22 ± 81.62, 794.53 ± 94.50 and 777.15 ± 104.29 for MIC5, MIC6, MIC7 and MIC9, respectively. There was no significant difference ($F_{(3,36)}$ = 0.365, p = 0.779, η^2 = 0.029). The results are presented in Figure 8.

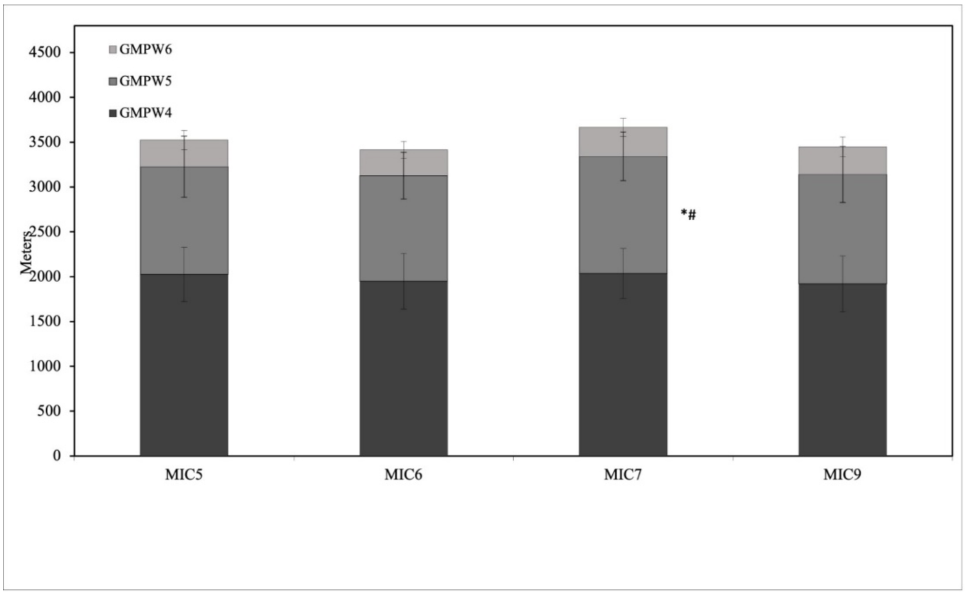

Figure 7. Average values for MPW4, MPW5 and MPW6 during the games that were played at the end of the microcycles. GMPW4 = distance covered with a metabolic power of 15.5–25.5 w/kg, GMPW5 = distance covered with a metabolic power of 25.5–50 w/kg, GMPW6 = distance covered with a metabolic power >50 w/kg; MIC5 = five-day microcycle, MIC6 = six-day microcycle, MIC7 = seven-day microcycle, MIC9 = nine-day microcycle; * difference from MIC5, $p < 0.05$; # difference from MIC6, $p < 0.05$. Error bars are 95% confidence limits.

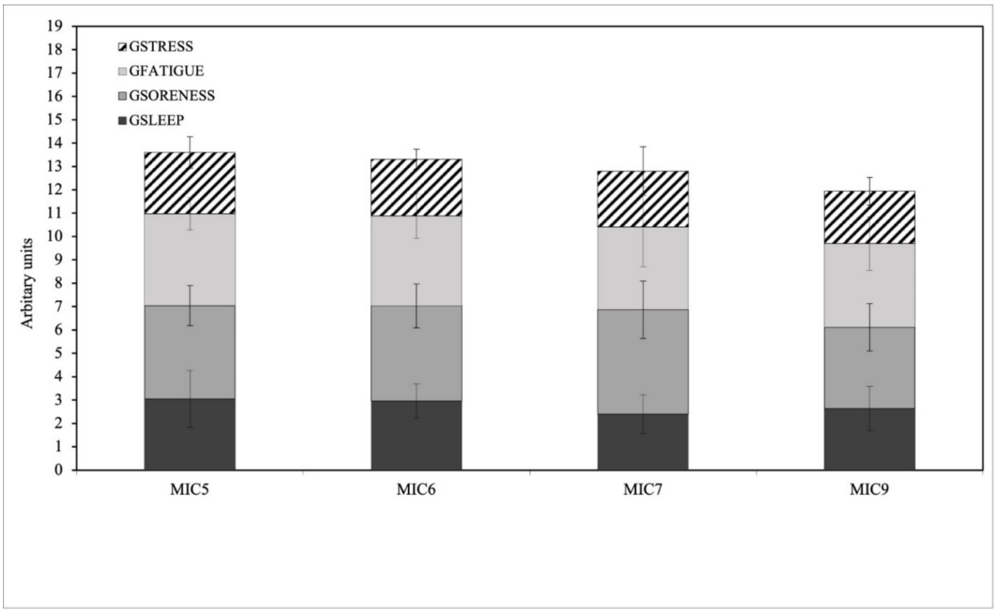

Figure 8. Wellness score average values after the games that were played at the end of the microcycles. GSLEEP = sleep responses, GSORENESS = muscle soreness responses, GFATIGUE = fatigue responses, GSTRESS = stress responses; MIC5 = five-day microcycle, MIC6 = six-day microcycle, MIC7 = seven-day microcycle, MIC9 = nine-day microcycle. Error bars are 95% confidence limits.

4. Discussion

4.1. Microcycles Load Differences

Our results demonstrate the differences in the training load between the microcycles. It was expected to have a greater load with high-intensity parameters in the long microcycles. Specifically, MIC5 had lower ACC2 and DEC2 numbers than MIC6, and both had lower numbers than MIC7 and MIC9. MIC7 and MIC9 had higher AAC3 numbers compared with

MIC5, and MIC6 had lower numbers only compared with MIC9. For DEC3, differences were found only between MIC5 and MIC9, while contrary results were obtained in another study with a higher number of decelerations <-3 m/s^2 in regular microcycles [13]. This reflects our training protocol according to which in the long weeks, the performance training on the middle days contained small- and large-sided games where the players could accumulate accelerations and decelerations [32]. The maximal sprint training applied to long microcycles, where the players had more days to recover [38], can explain the increased number of ACC3 in MIC9. We were expecting the same results for MIC7, but because of the two consecutive trainings with high loads and intensity (MD − 4, MD − 3), the load was usually decreased on the following day. The same strategy was used in a previous study [2]. This could result in a similar ACC3 load in MIC7, MIC6 and MIC5. In other studies, there were no differences in accelerations > 3 m/s^2 between the short, regular and long microcycles, but only between specific days of the week [13]. This can be explained by the different microcycle formats (3, 4 and 5 days for short, 6 and 7 days for regular, 8 and 9 days for long microcycles in one study and 5 or 6 days for short, 7 days for regular and 8 or 9 days for long in the other) and our intervention program that targeted the maximal sprint speed in MIC7 and MIC9. Another study by Clemente et al. (2019) [28] found similar results with ACC and DEC values higher in the microcycles with five training days compared with microcycles with four and three training days. From our results, it seems that accelerations and decelerations can discriminate the short- and long-duration weeks. Football players can cope with a high, relative to the game, load with respect to these parameters [28,29], but we suggest reaching a higher load in long microcycles.

Total distance was shorter in MIC5 than in all the other microcycles, and in MIC9, it was longer than in MIC6. Similar results were found in another study where the five-day training week had a longer total distance than shorter microcycles [28]. Moreover, other studies found that the length of the microcycle affects the workload both in volume and intensity between the training days with short microcycles having a shorter total distance on MD − 4 and MD − 3 [13].

For running thresholds, DIST, DIS4 and DIS5 were shorter in MIC5. The other microcycles seems to have a similar load except MIC9 compared with MIC6 that had a higher load for DIS4. For DIS6, both MIC7 and MIC9 had a higher load compared with MIC5 and MIC6. This confirms the target of our intervention program for long microcycles to have specific performance training with a focus on reaching the max speed and accumulate HSR. Similarly, for metabolic power distance, MIC5 had the lowest value for MPW5 compared with the other microcycles, and MIC6 had the lowest MPW6 compared with MIC7 and MIC9. Interestingly, MIC7 had a higher MPW4 value than that in all the other microcycles, even than that in MIC9. The results from other studies partially support our findings. There were differences in the total HSR and HML distances on all training days (except MD + 1 for HSR and HML), with lower values in short microcycles [13]. Similarly, the length of the microcycle had a significant effect on HMLD but not on the sprint distance (>24 km/h) [13]. In this study, HMLD was longer in the regular microcycle (7 days) compared with long microcycles on MD−5 but shorter on MD − 2. In short microcycles, HMLD was longer on MD−2 compared with the regular microcycle but shorter on MD−1 compared with long and regular microcycles. Finally, another study showed that the values for total running distance (14–19.9 km/h) and HSR distance (20–24.9 km/h) were elevated in longer microcycles [28]. Unfortunately, the different methodologies used in these studies did not allow for further comparisons.

For SPEFF and MPWEF, the load was lower in MIC5 compared with MIC6 and lower in both of them than that in MIC7 and MIC9. The results obtained by Oliva-Lozano et al. (2022) [13] revealed that there was no systematic difference between the different-duration microcycles but rather between specific days. In one study, during short microcycles, the number of high-speed actions (>21 km/h) was less on the most demanding days (MD − 4, MD − 3) [13], but in another study, the high-speed actions (>24 km/h) were fewer on MD − 2, during the regular microcycles [22].

Likewise, in the external load variables of MIC5, the s-RPE value was lower compared with the other microcycles, and MIC9 had a higher load than that of MIC6 and MIC7. This is contrary to the results of another study where s-RPE and external TL variables did not follow the same pattern [12]. The values from our study varied between 228.85 ± 59.39 and 334.35 ± 36.20 and were similar to the data from the literature [17,39]. Between the mesocycles, different s-RPE values may occur according to the results of one study where they found that in the first mesocycle, the s-RPE value was 331 ± 21.6 with a subsequent decrease in the 10th mesocycle to 239.3 ± 26.7, but that study did not examine the different weeks' length [40]. To our knowledge, the only study that compared s-RPE values in different-duration microcycles was conducted in rugby league. There, the authors found that short microcycles had a lower load than the medium and long microcycles (209 ± 63, 235 ± 46 and 242 ± 40, respectively) for all playing positions [41]. In football, Clemente et al. (2017) [11] found that the s-RPE value was higher in the weeks with one match that in the two-match weeks. This is because the coaches schedule low-intensity training sessions between congestive matches to let the players recover from game fatigue [27].

For wellness responses, MIC9 had a lower load in STRESS, FATIGUE and SORENESS compared with MIC5. In MIC6 and MIC7, STRESS and SORENESS, respectively, were lower than in MIC5. Our results contradict the results obtained by Oliva Lozano et al. (2022) [13] showing no effect of the length of the microcycle on the HOOPER responses. Another study revealed that games' frequency can affect the players' responses. They found that in the two-match week, the score increased for FATIGUE and SORENESS and in a one-match week for STRESS [11]. Manipulating the volume and the intensity in long weeks (by decreasing the load between high-demand days) can be beneficial for the players. On the other hand, in short weeks, the values were higher but without a significant difference except for MIC9, maybe because the unloading strategy that was applied in MIC5 succeeded in limiting the fatigue from the previous game. Therefore, we suggest that in order to keep wellness score at a lower level and avoid the negative results of the game fatigue similar strategies should be used in the short weeks to retain players' performance in the following game.

4.2. Games' Load Differences

The only significant difference in accelerations and decelerations was revealed for GDEC2 in MIC7 compared with MIC5 and MIC6. The results for GDEC2 were similar in MIC9 and MIC7 (66.26 ± 16.15 and 67.68 ± 10.30, respectively), but the analysis did not find a significant difference between MIC9 and the short microcycles. Our results partially agree with the results of other studies where high accelerations and decelerations in short microcycles had lower values than those in regular and long microcycles, and high decelerations were more often in regular microcycles [13,22]. For running distance, there were no differences for GDIST, GDIS4, GDIS5 and GDIS6. Other studies also did not find any differences in the total distance and the distance covered at a speed >24 km/h, but the distance covered at a speed >21 km/h was greater in the long microcycles [13]. For GSPEF, the values were higher in MIC7 and MIC9 compared with MIC5 and MIC6, but there were no differences for GMPWEF. In other studies, no differences were found for actions at speeds >21 km/h and >24 km/h [13,22,24]. For metabolic power distance, only in MIC7, the GMPW5 had a significantly higher value compared with MIC5 and MIC6. This is associated with the elevated DEC2 in MIC7 [42]. In MIC9, it was higher than in MIC5 and MIC6 but without a significant difference. Oliva-Lozano et al. (2022) [13] found that HMLD was greater in long microcycles, but another study from the same authors did not find any differences [22,24]. From our results it seems that the training plan that was applied to these different-duration microcycles helped the players to maintain the same performance with only some small increases in MIC7 (GDEC2, GSPEF, GMPW5). Similar findings from another study indicate that the length of the microcycle did not influence the worst-case scenarios on a match day, but contrary results came from another study that found that the matches' workload after long microcycles was greater than after regular and short microcycles [22–24]. Finally, it is important to mention that weeks with a lower number of training sessions indicate a higher possibility of winning the upcoming match [29].

There were no differences in the s-RPE values between the games that were played at the end of the different-duration microcycles. This is associated with the external load that seems to have minor differences (and only for MIC7). A rugby league study did not find any differences between matches that were played after different-duration microcycles, but only some differences were found between the playing positions [41]. Additionally, for some correlations found between the s-RPE values and match results, the values were higher when there was a defeat and lower when there was a draw [12].

Finally, there were no significant differences in GSLEEP, GSORENESS, GFATIGUE and GSTRESS, although for MIC7, the values were lower. These results agree with the results of another study which found no effect of the length of the microcycle on HOOPER responses [24].

This study has some limitations: (a) only the data from the players that participated in the games were collected, (b) all data belong to one professional team, and comparison with other populations should be made cautiously, (c) changes in the players' performance over the season were not considered, but the purpose of this study was to evaluate the short-term effect of the microcycle on the next game.

5. Conclusions

From the findings of this study, we can conclude that the different durations of the microcycles do not negatively affect the load during the games. Stress, soreness and fatigue show lower values in the longer-duration microcycles. In addition, shorter duration of the microcycle permits a higher weekly average load for acceleration and deceleration, metabolic power, but does not impact the running speed distance, stress, soreness and fatigue, which have the tendency to be lower in longer microcycles.

Author Contributions: L.V., Y.M., T.M., K.C. and I.G. designed this study and provided critical feedback on the manuscript; L.V., P.T., A.M., I.G., C.Z. and G.M. collected, processed and analyzed the data and revised the first draft; G.M. conducted the statistical analysis. All authors have read and agreed to the published version of the manuscript.

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Data Availability Statement: Data are available upon request from the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

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