INTRODUCTION

Controlling training load is widely considered to be essential for attaining desired training outcomes and preparing athletes to perform in both individual and team sports [1-3]. Evidence supporting relationships between training loads and performance [4, 5] and their association with risk of injury [6] has contributed to this monitoring process becoming increasingly important in professional soccer teams and elite youth academies. Accurate monitoring of an individual soccer player's daily training load is essential for its effective manipulation, attaining the specific goals of each training session [7, 8], and improving physical adaptations [1, 9]. Modulating variables relating to the duration, intensity, frequency, distribution, and nature of training can directly influence the physical stimulus elicited [10, 11]. This is of particular importance when considering the prescription of a soccer-specific training plan and its effects [12] on the development of youth players physical abilities.

During the in-season phase, the training plan design – or training periodisation – is aimed to optimize the players' performance levels and is usually structured according to the time frame of the intervention, whether over 1 training week, a monthly training block or a longer period of the season (i.e., micro-, meso- or macro-cycles respectively) [2, 13]. The strategies applied within these distinct periods aim to balance the technical-tactical elements of training designed by coaches with the physiological stimulus required to maintain or increase individual players physiological capacities [14]. Weekly microcycles represent the building blocks of a training plan and encompass diverse elements (e.g., loading, recovery, skill development, etc.) that are key to the management of training load [2, 7] and likely to impact players performance levels [2]. Indeed, it has recently been shown that there is a progressive increase in the weekly training load accrued by Under 15 to Under 17 age groups, with significant differences recorded between each age group [15]. Factors relating to the volume and intensity of training need to be carefully controlled between matches if athletes are to recover before future matches while receiving a sufficient training stimulus to maintain their physical qualities [15, 16]. This aspect becomes increasingly important when repeated cycles of competition make it difficult to provide an adequate training dose to develop players physical capacities [17] and influence players injury risk [18]. This is a critical component for training in elite-level youth academies, where one of the main objectives is to produce players that are physically prepared for the demands of the professional game. Therefore, gaining a greater understanding of the microcycle structure can aid the planning phase and help to ensure that youth players are best prepared for the age-related training demands.

To date, few studies have assessed the training characteristics and training loads experienced by elite youth soccer players [8, 19, 20] during in-season microcycles. These studies have described the weekly training load profile and the quantity of load accrued on the different days of a weekly microcycle, documenting subtle differences in the loading strategies applied across different age groups in elite English and Portuguese youth soccer players [19, 20]. Reduced variability in training load between- and within-weekly microcycles have also been reported in young soccer players, with slight differences recorded according to playing position [17]. However, these aspects have yet to be fully examined as studies have reported cohorts with limited sample size, over relatively short periods (e.g., from two to nine weeks, up to one competitive season) [8, 19, 20], and are recorded from a single club and/or coach. Further insights into the training loads experienced within a weekly microcycle, and how it is influenced by player age, can help to inform decisions relating to the training plan in these specific age groups.

). At present, the quantity and distribution of training loads performed during weekly microcycles has been described in elite and sub-elite level adult soccer players from across a number of different European countries (e.g., England, Spain, Portugal, The Netherlands; age range: 20 – 27 y) [7, 9, 21-26]. These studies mainly assessed players external load and highlighted substantial differences in the periodization of load across a weekly microcycle, modulating the volume and intensity of load performed across the different sessions [7, 9, 21-26]. Indicating that there appears to be a distinct “loading phase” before a marked reduction in load (tapering phase) preceding the next competitive match [7, 9, 22, 26]. Assessing players internal load (i.e., psycho-physiological stress experienced by each individual athlete) can help to evaluate individual athletes’ response to the external load recorded [1, 12]. One of the few studies that investigated youth soccer players weekly training volume and internal load (i.e., players perception of effort and heart rate measures) reported older players (i.e., Under 18) to record higher levels than younger age groups [27]. Indeed, another key aspect to consider when evaluating the load prescribed within a training plan is the variability of the physical stimulus, widely considered to be one of the primary drivers of training adaptation [2, 28, 29]. This is of relevance for youth soccer players, who have not yet reached their full physical development [11] and there is an emphasis on developing their physical capacities as they progress through the academy. Indeed, the loading strategies applied during in-season training of elite adult soccer players [7, 9, 22, 25] may not be appropriate for younger athletes. Furthering our knowledge relating to the loading strategies applied in microcycles, and their variability can help inform periodization in this specific population.

Studies that describe the age-related changes in training load are required to understand best practice approaches and inform the development of elite youth players. Therefore, this study aimed to describe the distribution of training load variables (sRPE, duration, and sRPE-training load) across a weekly microcycle and the differences in the management of these load variables across different age groups of an elite youth academy.

METHODS

Experimental Approach to the Problem

Descriptive analyses were conducted on training and match data collected via a player monitoring program across five competitive seasons (2014-15 to 2018-19) of an elite youth soccer academy. Recording data from a new squad of players for each age group each season ensures 5 years of data across all age categories of the academy system. Mixed models were utilized to conduct a cross-sectional analysis of sRPE, duration, and sRPE-training load recorded by four different age groups (Under 15, U15; Under 16, U16; Under 17, U17; Under 19, U19) [15]. The distribution of these variables across weekly training microcycles including 4 training days before a match was assessed. In the current study only full training weeks from the in-season period, including one competitive fixture, were considered for the analysis. Each weekly microcycle with a competitive match is considered as a separate event (range: 20 – 27 weeks per season across the four age groups) for a total of 107, 107, 108, 128 training weeks for U15 to U19 respectively.

Participants Elite male youth soccer players from the same soccer academy participated in this study. For the analysis, players were grouped according to their age group (U15 - U19), with a new squad of players monitored in each age group, each season. Being a longitudinal study some of the players transitioned between age groups as they progressed through the Academy system, these players accounted for approximately 50% of the observations for each

	Under 15	**Under 16**	**Under 17**	**Under 19**
n	107	108	104	137
Age (y)	14.4 ± 0.3	15.4 ± 0.3	16.4 ± 0.4	17.9 ± 0.7
Height (cm)	172.9 ± 6.6	177.0 ± 6.2	179.0 ± 5.8	179.5 ± 12.4
Weight (kg)	59.3 ± 7.2	65.5 ± 6.4	69.4 ± 6.2	74.8 ± 11.3

age group (range = 57 – 65 across the four age groups respectively). The players anthropometric characteristics are presented in Table 1. Written consent was obtained from each subject and their legal guardian before the commencement of the study. The study was approved by the University Research Ethics Committee (UTS HREC ETH19-4420).

Table 1. Anthropometric measurements collected from players of the four age categories across the 5 competitive seasons evaluated (mean ± SD).

Procedures

Each player's internal load responses to training and matches were quantified applying the session-RPE (sRPE) method, using the Category Ratio 10 (CR10) scale [30, 31]. At the start of each competitive season, all players participated in an education session designed to familiarize them with this method and the correct use of the Borg Scale [15, 31]. This session was organized as a direct lesson with the academy sport scientist to introduce the concept of perception of effort, thinking of what a maximal effort is, how to use the verbal anchors on the CR10 Borg scale and the possibility of using half points to best define the numerical value that corresponds to each individual players perception. Players sRPE score was systematically collected by hand by the teams' sport scientist ~30 min following the end of every session, conducted on a one-to-one basis by looking at the scale and verbal anchors. The duration of each training session (minutes) refers to the time elapsed from the initiation of warm-up to the completion of the last drill. On match days the duration refers to the sum of warm-up (~25 min) and the length of the competitive game. The sRPE-training load for each session was subsequently calculated by multiplying the player's sRPE by the duration of the session [30]. All training-related data was securely stored in a bespoke in-house monitoring software developed by the club.

To standardize the microcycle analysis between the five different competitive seasons and different age groups (i.e., different rest days or modified training schedules) we determined the weekly microcycle to include four training days before a match. This selection was made to normalize the microcycles from additional sources of variability (e.g., influenced by travel requirements). The mean weekly microcycle distribution (day-to-day variance) was assessed by evaluating the different training days in relation to the next competitive fixture (e.g., three days before a match is calculated as Match Day [MD] minus 3 (MD-3)). Data included for the analysis required the players to have completed all team training sessions that specific week and at least 75% of the competitive match.

The tactical objective of each session guided the selection of drills and pitch dimensions applied by coaches. The content of the training sessions consisted of technical and tactical drills, generally including passing and control drills, small-sided games, ball possession drills, and training matches. In addition to pitch-based drills, the players also performed one session per week dedicated specifically to gym-based exercises (~40 min) comprising body-weight functional exercises and exercises utilizing isoinertial machines. The training schedule was determined in accordance with the timetable of the in-house international school, while the training microcycle itself was planned by the individual staffs employing a structured approach that was typically cyclical but also incorporated diverse factors in its programming [32]. Details relating to the program of a standard training week are shown in table 2.

Table 2. Overview of a typical training week for the four age groups of the youth academy.

	MD-x	Under 15	Under 16	Under 17	Under 19
MON	MD-6	Rest	Rest	Rest	Rest
TUE *	MD-5	TT, RD	TT, RD	TT, RD	TT, RD
WED	MD-4	RT, TT	RT, TT	RT, TT	RT, TT
THU	MD-3	TT	TT	TT	TT
FRI	MD-2	TT	TT	TT	TT
SAT	MD-1	Rest	Rest	TT	TT
SUN	MD	Match	Match	Match	Match

MD-x: number of days prior to the next competitive match (MD), Rest: day off / with no official training session programmed, TT: technical & tactical training drills (including numerous diverse methods, e.g., technical exercises, small-sided games, training matches etc.), RD: aerobic endurance running drills, RT: resistance training performed in the gym. *, not assessed in the present study.

Statistical Analysis

Hierarchical Linear Mixed models were used to detect differences in sRPE, session duration, and sRPE-training load across the different training days of a weekly training microcycle and between the four different age groups. Individual players were included as a random effect with season and age group considered as fixed covariates because repeated measures were recorded for each player across the different microcycles and competitive seasons. Estimated marginal means and 95% confidence intervals (95% CI) were calculated for each Match Day of the microcycle for all three outcome variables with a Bonferroni correction applied. To better interpret the variation between the different age groups we computed Cohen's *d* effect size and their 95% CI from the mixed model. The threshold values utilized for the interpretation of Cohen's *d* were as follows: <0.20, *trivial*; 0.20–0.59, *small*; 0.60–1.19, *moderate*; 1.20–1.99, *large*; >2.00, *very large* [33]. Statistical significance was set at $p < 0.05$. All analyses were conducted using SPSS version 22 (SPSS Inc, Chicago, IL, USA).

RESULTS

The in-season training data of 230 unique players were recorded during the five competitive seasons analysed, for a total of 5,557 individual training observations across the four age groups. Details relating to the differences between age groups within each training day of the microcycle are presented in Table 3. Comparisons of sRPE, duration, and sRPE-training load of each age group, stratified per training day (MD-*x*), are presented in Figure 1.

U15 recorded lower levels of sRPE on MD-4 and MD-3 compared to the older age groups (*d* = 0.43 – 0.72). The day before a match (MD-1) U16 recorded the highest sRPE, with small differences compared to U15 and U17 (*d* = 0.50, 95% CI: 0.38 – 0.63 and 0.38, 95% CI: 0.25 – 0.58), respectively), while moderate for U19 (*d* = 0.70, 95% CI: 0.50 – 0.90). Moderate increases were found in levels of sRPE between U15 and U16 (*d* = 0.91, 95% CI: 0.76 – 1.08) on MD. Only small increases in sRPE were observed on MD from U16 to U17 (*d* = 0.31, 95% CI: 0.18 – 0.43) before a plateau between U17 and U19 (trivial, *d* = -0.06, 95% CI: -0.07 – 0.19).

On MD-4 training duration was significantly lower for U19 than in the other age groups (*d* < -1.10). A small difference in duration remains between U19 and the younger age groups in

MD-3 (*d* = -0.43 – -0.49). Only U15 recorded small differences in duration compared to the older age groups on MD-2, while U17 recorded lower duration on MD-1 (*d* = -0.34 – -0.46). Small increases in match duration resulted in a moderate difference between U15 and U19 (*d* = 1.07, 95% CI: 0.79 – 1.34) and U16 and U19 (*d* = 0.73, 95% CI: 0.60 – 0.89), respectively.

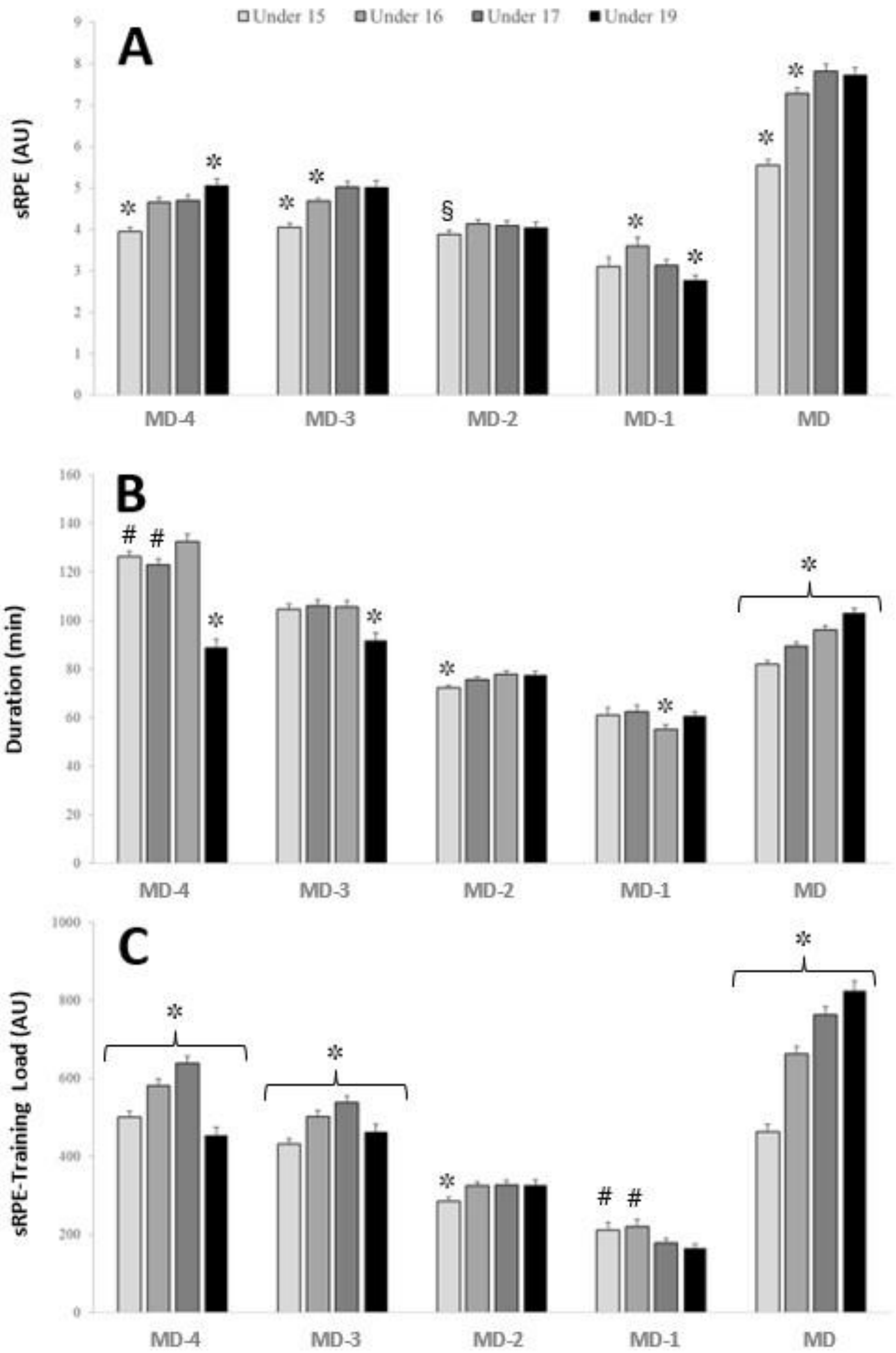
Moderate differences in sRPE-training load were observed on MD-4, with U19 levels lower than U16 and U17 (*d* = -0.65, 95% CI: -0.78 – -0.52 and *d* = -0.94, 95% CI: -1.07 – -0.81, respectively). On MD-3 U17 recorded the highest sRPE-training load, with small differences compared to the other age groups. Only U15 reported small differences in sRPE-training load compared to the older age groups on MD-2, while U19 was found to have lower levels compared to U15 and U16 on MD-1 (*d* = -0.51 – -0.62). A gradual increase was observed in sRPE-training load on MD across the different age groups, with moderate differences observed between U15 and U17 (*d* = 1.16, 95% CI: 1.05 – 1.37), increasingly to a large difference between U15 and U19 *d* = 1.38, 95% CI: 1.24 – 1.59).

Table 3. Mean difference (± 95% CI) of sRPE, duration and sRPE-Training Load between the four age groups across Match Days.

Variable	Age Group		MD-4	MD-3	MD-2	MD-1	MD
sRPE (AU)	U19	U17	0.36* (0.08 – 0.63)	-0.01 (-0.29 – 0.27)	-0.05 (-0.28 – 0.18)	-0.37* (-0.06 – -0.12)	-0.10 (-0.41 – 0.20)
		U16	0.40* (0.13 – 0.67)	0.34* (0.07 – 0.60)	-0.09 (-0.31 – 0.13)	-0.84* (-1.17 – -0.51)	0.44* (0.14 – 0.74)
		U15	1.11* (0.84 – 1.37)	0.97* (0.71 – 1.23)	0.16 (-0.06 – 0.38)	-0.35* (-0.69 – -0.00)	2.17* (1.87 – 2.48)
	U17	U16	0.04 (-0.16 – 0.25)	0.34* (0.12 – 0.57)	-0.05 (-0.24 – 0.15)	-0.47* (-0.81 – -0.12)	0.54* (0.30 – 0.79)
		U15	0.75* (0.55 – 0.95)	0.98* (0.76 – 1.20)	0.21* (0.02 – 0.40)	0.03 (-0.32 – 0.37)	2.28* (2.02 – 2.56)
	U16	U15	0.71* (0.53 – 0.88)	0.63* (0.44 – 0.82)	0.25* (0.09 – 0.42)	0.50* (0.11 – 0.88)	1.73* (1.52 – 1.94)
Duration (min)	U19	U17	-44* (-50 – -38)	-14* (-18 – -8)	0 (-3 – 2)	6 * (2 – 9)	7* (4 – 10)
		U16	-34* (-40 – -28)	-14* (-19 – -9)	2 (-1 – 5)	2 (-6 – 3)	14* (11 – 17)
		U15	-37* (-43 – -32)	-13* (-18 – -8)	5* (3 – 8)	0 (-5 – 5)	21 * (18 – 25)
	U17	U16	10* (5 – 15)	-1 (-5 – 4)	2 (-0 – 5)	-7* (-12 – -3)	7* (4 – 9)
		U15	6* (2 – 12)	1 (-3 – 5)	6* (3 – 8)	-6* (-11 – -1)	14* (12 – 17)
	U16	U15	-4 (-8 – 1)	2 (-2 – 5)	3* (1 – 6)	1 (-4 – 7)	8* (6 – 10)
sRPE-Training Load (AU)	U19	U17	-185* (-221 – -149)	-75* (-107 – -42)	1 (-23 – 24)	-14 (-34 – 7)	62* (22 – 101)
		U16	-128* (-163 – -93)	-39* (-71 – -8)	3 (-19 – 25)	-55* (-82 – -28)	161 * (121 – 201)
		U15	-48* (-82 – -13)	31* (1 – 62)	42* (21 – 63)	-46* (-75 – -16)	361* (320 – 402)
	U17	U16	57* (27 – 87)	35* (8 – 62)	2 (-18 – 22)	-42* (-71 – -12)	100* (68 – 131)
		U15	138* (108 – 167)	106* (79 – 133)	42* (22 – 61)	-32* (-63 – -1)	299* (267 – 332)
	U16	U15	81* (55 – 107)	71* (47 – 94)	39* (22 – 56)	10 (-25 – 44)	200* (173 – 227)

*, sig. effects at $p < 0.05$. sRPE - session rating of perceived exertion AU – arbitrary units, min – minutes. MD-4: four days prior to the next match, MD-3: three days prior to the next match, MD-2: two days prior to the next match, MD-1: one day prior to the next match, MD: Match Day.

Figure 1. Weekly periodization (Mean ± 95% CI) of sRPE (A), duration (B), and sRPE-training load (C) of each age group, stratified per match day of the microcycle.



sRPE – rating of perceived exertion, AU – arbitrary unit, min – minutes. MD-4: four days prior to the next match, MD-3: three days prior to the next match, MD-2: two days prior to the next match, MD-1: one day prior to the next match, MD: Match Day.

*, significantly different to all other age groups; #, significantly different to U17 and U19, §, significantly different to U16 and U17.

DISCUSSION

The present study provides a detailed analysis of the distribution of sRPE, training duration, and sRPE training load recorded by elite youth soccer players during in-season weekly microcycles. In all age groups, the most demanding day of the weekly microcycle was match day, with increased duration and sRPE compared to in-week training sessions. The main findings were significant differences in the daily training demands of a weekly microcycle, with notable differences in U15 and U19 compared to the two central age groups of the youth academy (i.e., U16–U17). These differences were mainly observed in the mid-week training sessions (MD-4 and MD-3) and likely related to the management of the stimulus prescribed to the players; with U15 recording lower sRPE and U19 lower duration. This may be explained, in part, by the large differences in MD training loads and the increased frequency of matches played by U19 compared to U15.

Similar to previous studies on Italian youth football players, the load incurred during a match in the present study accounted for ~25% of the week's total sRPE-training load [34]. Following national youth academy regulations, we observed match duration to increase systematically across the different age groups. However, the increase in duration (i.e., U15 = 70min, U16 = 80min and U17-U19 = 90min) was not mirrored by an increase in sRPE, where a plateau in perceived match intensity was observed from U17 to U19 age groups (8.1 AU) after a small increase from U16 (7.5 AU) and moderate increase from 5.7 AU in U15. These sRPE scores observed in the present study are slightly higher than those previously reported from semi-professional Italian youth soccer players [35] but lower than those reported from an elite English youth academy (8.4 – 8.5 sRPE (AU) for U14, U16, and U18, respectively), where no differences were recorded between age groups [19]. Determining the reasons for any differences in perceived match intensity is difficult, but factors such as the level of competition, game tactics/styles between different teams, and/or differences between the various cohorts may play a role.

Current results align with previous observations from professional soccer players, that have highlighted the most demanding training sessions are conducted in the middle of the training week [22, 24]. In the present study, the sRPE-training load was found to be greatest on MD-4 for U15 – U17, before a progressive decrease to the next MD. This is however in contrast with other reports on elite adult players, where a small to moderate increase in sRPE-training load was observed between MD-4 and MD-3 [7, 21]. The general observation of increased sRPE-training load in these sessions shows that the greatest internal training stimulus – or “loading phase” – is completed three to four days before MD. This approach allows for a sufficient physical stimulus to be applied, to prevent detraining, but also adequate time for any transient fatigue to substantially reduce before the next match [2].

Whilst there was a generally consistent pattern across all age groups, there were also some subtle differences between the age groups. Specifically, the sRPE-training load was lower during MD-4 and MD-3 in the youngest age group (U15), with the lower loads recorded attributed to lower sRPE values as the duration of the sessions is stable compared to U16 and U17. This may be due to a greater emphasis being placed on teaching the youngest age group of the youth academy important technical and tactical skills [36]. In elite youth Portuguese soccer players[36] focusing on this aspect has previously been documented to result in less physiologically demanding training sessions compared to U17 and U19 age groups. Indeed, an increased emphasis on the coaching of fundamental principles often requires more stoppages during training to explain game situations and less focus on the internal load elicited.

For the present study, we analysed a microcycle period including 4 training sessions before a match to maximise the number of observations across all four age groups, as the U19 age group tends to have much fewer 5-day microcycles than their younger counterparts. Therefore, it must be acknowledged that the internal training load recorded in these sessions could be influenced by the extent of recovery from the previous match [16] and the quantity of load performed in the MD-5 session. This appears to be more relevant when evaluating the periodization strategy applied in U19, as it was observed to include lower training duration and overall sRPE-training loads on MD-4 compared to the younger age groups. In general, the U19 age groups sRPE-training load was more evenly distributed across the microcycle, with less variability in training duration. A likely explanation for this subtle change in microcycle loading in U19 is the increased match load induced (in both sRPE and duration) and the increased frequency of match play in this age category [7]. Indeed, the sRPE training load recorded in U19s is similar to reports from professional players [7, 9, 37] and more closely reflects the organisation of an elite professional team; aiding the management of fatigue induced by the previous match (greater for U19 than U15) and allowing for the preparation of the next competitive fixture. This is likely due to the deliberate approach of youth academies to best prepare players for the professional game, increasing the similarity with first team practices as the players progress through the academy.

All age groups demonstrated a reduction in sRPE training load in the two days before MD, a weekly micro-taper, as reported elsewhere [26]. Whilst a pre-match taper is common, there have been different approaches reported. For example, a progressive decrease across the training week [7, 24], or a marked reduction in volume and intensity only on the day before a match (MD-1) [9, 17, 22]. In the present study, the reduction of sRPE-training load from MD-3 to MD-2 is greater than previously reported in elite English Premier League soccer players (~70–90 AU) [7], with slight differences observed between the different age groups. Interestingly, the progressive decrease observed in sRPE-training load across the weekly microcycle follows a similar pattern to the duration of the training, generally reduced by half for U15 - U17 age groups (~120 to 60 min), alongside the more stable sRPE values, highlighting the importance of managing training duration as a variable for achieving pre-planned loading goals in sport-specific training sessions.

The evaluation of training duration and intensity separately provide more insight into the nature of the training periodization. In the present study sRPE values recorded were found to be similar between the four age groups and stable at a moderate to high intensity in the mid-week training sessions (RPE between 3.88 – 5.02 AU for MD-4 – MD-2). This observation agrees with previous reports assessing levels of sRPE recorded in both youth (39) and elite level soccer players (23), even though small differences have been reported between different playing positions across the weekly microcycle (23). Together these results indicate that the periodization across the weekly microcyle appears not to be focused on the variation of players sRPE load. However, this could also be related to the Clubs specific training philosophy and caution should be taken when generalizing these findings to other academies.

The short taper period completed during an in-season weekly microcycle allows for the reduction of training stress and improves physical readiness, which has been shown to promote both recovery and performance [2]. In the present study, a reduction in sRPE was recorded only on MD-1, showing the pre-match taper to consist of both a reduction in volume and intensity. However, studies conducted on elite-level football teams have previously recorded no change in training duration during MD-1 [37, 38], suggesting that changes in sRPE-training load were due to a reduction in perceived exertion during these sessions. When interpreted collectively, reports highlight that a short taper period is common in soccer, however consistent approaches are not apparent. The periodization of load applied during the taper may be related to the philosophies of specific coaches or related to other factors related to the management of physical adaptations and performance [13, 39].

Furthermore, it must be considered that the expected difficulty level of the next competitive match may also influence the external loads prescribed during a competitive microcycle and on the day before a match [40]. Indeed, a limitation of the present study is that the evaluation of external load metrics (i.e., GPS data) across the training week are also warranted to fully comprehend the load being performed by the youth players. The stability observed in internal load across a weekly microcycle may not represent the external load prescribed. This evaluation was not feasible in the present study due to the long timeframe assessed and changes in the GPS technology available within the Club. When interpreting training load data, the assessment of each player's individual variations in load is recommended. Future studies should also examine the relationship between the internal and external load recorded across the different age groups.

A detailed analysis of the distribution of sRPE, training duration, and sRPE-training load within weekly micro-cycles provides new insights into the variability in training approaches used by an elite soccer academy. An interesting observation across the four age groups relates to the stability of the levels of load and training volume recorded in this large multi-season dataset, despite changes in coaching staff and different squads of players across the five competitive seasons studied. This limited variation in weekly micro-cycles also contributes directly to the small fluctuations across longer periods of the season [7, 9]. This finding indicates the use of a common general structure for the programming of in-season training micro-cycles in elite youth soccer.

The present study provides a detailed analysis of the distribution of sRPE, training duration, and the sRPE-training load of elite youth soccer players assessed across a long timeframe and with a greater number of subjects than previous reports. Differences in sRPE and duration were observed between the different training sessions within in-season training microcycles and age groups (mainly U15 and U19). The magnitude of reduction in sRPE-training load during a weekly microcycle appears to be attributable to the reduction in training duration. This insight can aid practitioners working in elite youth soccer academies to guide decisions relating to load management across distinct age groups and help to influence players subsequent performance [41].

PRACTICAL APPLICATIONS

Utilizing an evidence-informed approach to training design can greatly assist with the crafting of progressive training programs that can facilitate the transition of elite youth players through the different age groups of an elite-level academy. This investigation provides a detailed insight into the training characteristics of a weekly microcycle, aiding practitioners and coaches in comprehending the distribution of training load across the training week. In a long-term prospective it is important to consider the subtle differences between the three load variables assessed and how they interact with each other. The consistency of sRPE values across the three central sessions of a weekly microcycle, despite differences between age groups, indicates that adjusting training duration plays a pivotal role in managing load effectively. The higher training loads observed during matches across all age groups (sRPE and sRPE-training load) underscore the significant physical demands that players must prepare for. Accordingly, the differences in training load observed across the different age groups appear to be aimed at fine-tuning the plan for recovery, whether between matches (e.g., U19) or simply reducing load before the next competitive fixture.

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