

# Planning and Periodization Strategies in Youth Categories of the Spanish National Football Team: An Adaptive Approach to the International Context.

Antonio José Gómez-Díaz,<sup>1</sup> Carlos Rivera-Campesino,<sup>1</sup> Javier Mallo-Sainz,<sup>2</sup> Miguel Ángel Campos-Vázquez<sup>1</sup>

<sup>1</sup>Real Federación Española de Fútbol

<sup>2</sup>Facultad de Ciencias de la Actividad Física y el Deporte. Universidad Politécnica de Madrid

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## Headline

**P**lanning and periodization in team sports, particularly in football, has been of crucial importance for coaches and fitness coaches (Campos-Vázquez and Jiménez-Iglesias 2024; De Hoyo-Lora and Suárez-Arrones 2022; Kelly and Coutts 2007; Mujika et al. 2018). Traditionally, models such as Tactical Periodization (Bordonau and Méndez-Villanueva 2018; Delgado-Bordonau and Méndez-Villanueva 2012; Lopategui, Paulis, and Escudero 2021) or Structured Microcycle (Martín-García et al. 2016; Tarragó et al. 2019) have been predominantly used. In these models, the weekly microcycle serves as the basic time unit (a seven-day training cycle) in which the training programs are developed.

Currently, elite football has increased its competitive exposure due to the growing number of matches and official competitions, both at national and international level that teams are involved in (Bradley 2024b; Modric et al. 2022; Saidi et al. 2022). Consequently, it seems necessary to adapt or adjust existing periodization models or even develop new models for short-duration microcycles with intervals of two, three or four days between matches, which characterize these high-density competitive periods (Gómez-Díaz et al. 2024). Within this highly demanding and congested competitive environment, national team tournaments also need to be respected (Bradley 2024b, 2024a; Shafizadeh, Taylor, and Peñas 2013). Specifically, youth tournaments exhibit significant variability in training camp durations (Szigeti et al. 2022), which increase the complexity of managing the external and internal load of the players (Vardakis et al. 2023).

Given these considerations, it is crucial to establish a planning and load management model tailored to the competitive demands of youth national teams. Hence, the ultimate goal would be to enhance the adaptation of the players and promote an optimal development of their physical capacities during their time with the national team.

## Aim

From all of the above, the aim of this study was to address the following objectives:

1. To develop a unique and precise methodology for monitoring players in the youth teams of the Spanish National Football Association,
2. To design specific microcycles within the planning model tailored to the international context for the national teams, adapted to the current congested schedules to facilitate both performance and recovery across all the competitions.

## Methodological Principles of Training Periodization in Spanish National Youth Teams

The fitness coaches, integrated in the Physical Preparation Department, play a key role in the technical staff of the youth teams of the Spanish National Football Association (RFEF). Inside this context, one of their duties was to define fundamental principles and processes to develop a specific periodization for the peculiar context of youth national teams. This approach considers the particular characteristic of the footballers and the tournaments national teams take part in, with the objective of optimizing both the players and team performance, at the same time of trying to reduce the incidence of injuries under this high demanding competitive environment.

One of the main differences between the competitive dynamics of national teams and clubs is the level of adaptation or fitness of the players at the beginning of the training camp. At club level, all the players of the team follow the same calendar of competitions so after every game the coaching staff has all the necessary information to manage training loads during the following days. Under this perspective, it is common to arrange differentiated training stimulus for the players based on their participation in the previous competitive match (Clemente et al. 2024).

However, this process becomes significantly more complex in the context of national teams due to several factors. First of all, not all the players begin the training camp with the same competitive exposure. For example, if the training camp starts on a Monday, some players may have had their last competitive stimulus the day before (Sunday), while others may have competed two or three days earlier (Saturday or Friday) or even not having competed at all during the last days. Secondly, players have to travel from different locations to start the training camp in Spain and, in some cases, additional travel may be required if the tournament takes place abroad. These logistical factors can increase stress and fatigue levels, particularly for the players who had a late kick-off the night before the training camp begins. The situation becomes even more challenging if they have had to endure long journeys with minimal time for sleep and recovery (Lastella, Roach, and Sargent 2019).

Figure 1 provides an example of the different scenarios that can arise before the start of a training camp for a youth national team of the Spanish National Football Association, which translated in presenting highly variable levels of well-being (McLean et al. 2010). These results are a consequence of the influence of several factors on the players starting the training camp, including the number of minutes played, the timing of their domestic matches, the quantity and quality of sleep the night before, and/or the travel they had to undergo to arrive to the training camp.

Player	Player position	Game Day 1	Min Game 1	RPE Game 1	Game Day 2	Min Game 2	RPE Game 2	Hours Sleep	Wellness total
Player 1	Goalkeeper	Sunday	0	0				8	21
Player 2	Goalkeeper	Saturday	80	4				8	24
Player 3	Goalkeeper	Saturday	0	0				10	22
Player 4	Right full back	Sunday	20	6				7	24
Player 5	Centre back	Sunday	90	9				8	18
Player 6	Centre back	Saturday	90	8				7	19
Player 7	Centre back	Sunday	90	9				5	21
Player 8	Centre back	Saturday	80	5				7	22
Player 9	Left full back	Sunday	55	6				8	22
Player 10	Left full back	Saturday	20	7	Sunday	75	8	8	19
Player 11	Holding Midfielder	Saturday	90	8				7	16
Player 12	Holding Midfielder	Saturday	80	8	Sunday	45	6	8	17
Player 13	Midfielder	Sunday	60	8				7	15
Player 14	Midfielder	Saturday	80	8				6	20
Player 15	Midfielder	Sunday	0	0				5	20
Player 16	Midfielder	Sunday	65	6				8	22
Player 17	Winger	Saturday	65	7				8	24
Player 18	Winger	Saturday	80	6				8	22
Player 19	Winger	Sunday	35	4				7	22
Player 20	Winger	Saturday	25	6				7	19
Player 21	Striker		0	0				6	21
Player 22	Striker	Saturday	35	4				7	23
Player 23	Striker	Sunday	77	7				7	21

Fig. 1. Individual status in relation to match day(s), competition participation, post-match RPE, sleep hours, and overall pre-camp wellness among different players from the same youth national team.

PLAYER	TEAM	
Number competition games last week (Mo-Su)	1	
Competition minutes last week (Mo-Su) / CU	85	0,94
Acumulted HSR last competition game	456	
RPE last competition game	8	
Maximum Player Speed (km/h)	33,4	
Last day reached 90% Max Speed	Thursday	
Injuries - Discomfort last week	None	
Observations	Individual routine attached	

Fig. 2. Report requested from clubs by the national team fitness coach prior to the start of each training camp. CU: competition units

Additionally, players often experience congested schedules in the weeks leading up to a national team training camp (Carling et al. 2015). In youth categories, it is relatively common for some players to compete in multiple matches on consecutive days during the weekend prior to joining the national team (Figure 1, players 10 & 12). To better monitor these situations, we tracked the number of Competition Units (CU) accumulated by each player in the three to seven days preceding their arrival to the national team. From a practical point of view, 1 CU represents full participation in a match within their category (e.g., 90 minutes). For younger age groups, this duration may be reduced to 70 or 80 minutes, depending on the competition regulations for each category (U-14, U-16, etc.). Despite its apparent simplicity, this variable used to quantify the volume of participation in competition, is a key metric which will be further employed in the periodization and competitive load management model presented in the following sections for each of the microcycles.

To achieve a holistic planning approach, another fundamental aspect was to enhance the flow of information and communication with the clubs (Ekstrand et al. 2019). To facilitate this process, the Physical Preparation Department organized a series of meetings with club representatives to implement specific tools aimed at establishing common procedures for monitoring the status of the players (Casamichana et al. 2019), and for reciprocal communication respecting the individual circumstances of each club. During these sessions, the model

detailed in this paper was presented to the fitness coaches of every club, with the objective of improving the information exchange to rise the performance levels of selected players. To streamline and objectify communication, clubs were provided with a standardized spreadsheet containing the most relevant information prior to the start of each training camp, particularly regarding accumulated (external-internal) load and the current status of the players, as illustrated in Figure 2.

Another crucial issue to consider when planning the training camps was the timing of these events within the season. For longer tournaments, a distinction could be made between those held during the final phase of the in-season period, such as the UEFA European Under-17 and Under-21 Championships, and those taking place before the start of a new season, like the Olympic Games or the UEFA European Under-19 Championship. In some cases, long-duration tournaments are scheduled during the first half of the in-season, as the FIFA Under-17 and Under-20 World Cups. This disparity in the timing of the tournaments has significant implications for the design of the preparatory phases preceding competitions. For example, tournaments held at the end of the season are characterized by short preparation periods (7-10 days), during which players often arrive with greater levels of fatigue (Nobari et al. 2020, 2021), due to the substantial competitive workload accumulated throughout the season (Djaoui et al. 2022; Pillay et al. 2022). This factor must be carefully considered when managing both training and competition loads during the tournament.

In contrast, tournaments taking place before the start of the new season (July-August) typically allow for a longer preparation period (20-25 days), although not as long as the pre-season habitually conducted by professional teams (Francioni et al. 2016). Key considerations for these tournaments include potential differences in the duration of the off-season periods of the players, depending on when their previous season ended (some players may have had minimal rest due to participation in promotion playoffs at the end of the season) and the challenges of scheduling friendly matches during this time, because there are not many available choices at this stage of the season.

As previously mentioned, the elevated competitive density plays a crucial role in the context of national teams, reaching very high or even extreme levels in certain short-to-medium duration tournaments (please see next section). In these competitions, matches may be played every 48 hours, with training sessions classified as MD+1/MD-1 between the games. These types of sessions, which are uncommon in professional football, require a specific approach. For the players who have accumulated a high volume of minutes in the match preceding the training session, implementing recovery routines becomes the top priority, avoiding impact-related work on the field. However, it must be considered that these players should still be available to play, at least partially, in the next match (24

hours later). On the other hand, for players with limited or no participation in the previous match, the strategy focuses on activation drills with a low level of complexity (primarily analytical work, both in tactical and physical aspects). This approach helps to mitigate the risk of accidental injuries and minimizes developing excessive fatigue during training, an essential element in this context (Vanrenterghem et al. 2017). Nevertheless, the most decisive factor in scheduling and periodizing these types of tournaments is establishing a "reasonable" limit on the number of CU accumulated by each player.

**Types of Training Camps and Microcycles**

This section provides a detailed explanation of the training and competition dynamics that characterize the most common competitive cycles in the youth teams of the Spanish Football Association. These cycles are presented based on their duration and are classified as short (3-5 days), medium (7-10 days), or long cycles (more than 10 days).

**SHORT CYCLE. 3 Days - 1 Match**

This microcycle consists of two training days (Monday and Tuesday) followed by a match on Wednesday, which is typically a friendly preparation game (Table 1).

**Table 1. Training camp 3 days and 1 match**

MONDAY	TUESDAY	WEDNESDAY
MD+1/MD-2	MD+2/MD-1	GAME
Recovery - Optimization	Recovery - Activation	Competition

The first thing to consider is the number of minutes played by each player during the previous weekend and their travelling conditions. Thus, the recommendation is to divide the team into two groups (recovery and compensatory) during both training sessions (MD+1/MD-2 and MD+2/MD-1) based on the following criteria:

- **MD+1/MD-2:** Players who have accumulated more than 0.7 CU on Saturday or more than 0.5 CU on Sunday will be assigned to the recovery group, while all other players will complete the compensatory session.
- **MD+2/MD-1:** Only players who have accumulated more than 0.7 CU on Sunday will remain in the recovery group, while the rest will join the activation group.

Even though the previous was a general consideration, there are additional features to be examining when conforming the training groups for MD-2 and MD-1 training sessions as: responses from wellness and RPE questionnaires (Foster et al. 1995; McLean et al. 2010), traveling conditions, chronic com-

petition load, physical demands of the last game, recommendations from the club staff of every club, requirements of the head coach, and other relevant factors.

As the game to be played on Wednesday is a friendly match, in order to prioritize the health of players and prevent injuries it is recommended to limit playing time for certain players. Specifically, those who have played a full match on Sunday with their club and reported an RPE of 8 or higher, and/or a wellness score below 20 on Wednesday should play a maximum of 0.5 CU on the competition day (Wednesday). Additionally, if a player has participated in two matches over the weekend, even if not in full, their playing time should also be restricted to a maximum of 0.5 CU.

**SHORT CYCLE. 4 Days - 2 Matches**

This microcycle consists of two training days (Monday and Wednesday) and two matches (Tuesday and Thursday), which are typically friendly games (Table 2).

**Table 2. Training camp 4 days and 2 matches**

MONDAY	TUESDAY	WEDNESDAY	THURSDAY
MD+1/MD-1	GAME	MD+1/MD-1	GAME
Recovery - Activation	Competition	Recovery -Activation	Competition

The first match (Tuesday) is influenced by the competitive minutes that every footballer played with his home club during the previous days. Players who have accumulated more than 0.7 CU on Sunday would not be fully recovered on Tuesday, which means that their availability for competition would not be optimal (Marín and Castellano 2023; Martín-García et al. 2018; Stevens et al. 2017). In this regard, one of recom-

mendation for the head coaches was to ensure that the squad selection included at least two footballers for each specific playing position, which allows that all players are involved in the games and prevents a player from exceeding 1.25 CU within 48 hours. This 1.25 CU limit should also apply to the match played on Thursday, meaning that no player should accumulate more than 1.25 CU across both matches (Tuesday and Thursday). Complementarily and considering the total work-

load from club and national team matches, no player should exceed 2 CU when adding all three matches. Furthermore, players who have played more than 0.5 CU in either match and reported an RPE higher than 8 should have their total playing time across both matches restricted to 1 CU. Finally, if a player reports a wellness score below 20 on match day, an adjustment in competitive load (minutes played) is recommended.

As in the previous type of cycle, the recommendation for the first training day (Monday, MD+1/MD-1), is to divide the team into two groups: recovery and activation. The recovery group should include all players who accumulated more than 0.7 CU on Saturday or more than 0.5 CU on Sunday.

### SHORT CYCLE. 5 Days - 2 Matches

This type of cycle which includes two matches within five days (where MD+2/MD-1 precedes the first match and MD+1/MD-1 comes before the second) shares many characteristics with the previous cycles (Table 3). Therefore, the approach applied to the first three days (two training sessions and one match) can follow the same structure outlined for the first cycle, as it replicates the same format. The last two days of the cycle (one training session and one match) align with the principles detailed in the previous cycle.

**Table 3. Training camp 5 days and 2 matches**

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
MD+1/MD-2	MD+2/MD-1	GAME	MD+1/MD-1	GAME
Recovery - Optimization	Recovery - Activation	Competition	Recovery - Activation	Competition

### MEDIUM CYCLE. 7-9 Days - 3 Matches

The level of difficulty increases when the number of matches rises to three, leading to specific considerations depending on whether the cycle lasts for seven, eight, or nine days. In the case of seven- and eight-day cycles, the characteristic sessions include MD+1/MD-2, MD+2/MD-1, and MD+1/MD-1.

These types of cycles are typically associated with four-teams tournaments held at a single venue, which require to travel to the event location, whether in Spain or abroad. Considering the overall context—travelling, tournament format, and competitive load prior to the training camp—it is essential to acknowledge the difficulty, intensity, and demands associated with such competitions. To minimize risks and optimize performance, careful planning is required, and adherence to the proposed recommendations should be prioritized whenever possible.

In these cycles, the first match is usually played on Wednesday, typically allowing two previous training sessions (MD+1/MD-2 and MD+2/MD-1). This schedule provides a narrow recovery window for footballers who played a full match with their club on Sunday, as they must recover and be fully prepared for the game on Wednesday, considering the additional fatigue caused by travelling with both their club and the national team.

Following the first match, the recovery period becomes significantly shorter as there are often only 48 hours between matches, particularly in seven- or eight-day cycles (Tables 4 and 5). Proper management of competitive load is crucial, especially for players who accumulate 1 CU in the match played

on Wednesday, and even more so if they also played a full match with their club the previous Sunday.

For this type of cycle with three matches, the recommendation to include two players per specific position in the squad becomes even more important, as it helps to ensure a more balanced distribution of playing time. In this regard, it is advisable to limit players to a maximum accumulation of 1.25 CU across two consecutive matches, particularly when there is only one rest day between games, and a total of 2 CU over the entire three-match cycle. Additionally, it is important to assess specific cases, such as players who play 45 minutes or less but report an RPE higher than 8. In these situations, it may be necessary to consider limiting their participation in the next match, either by keeping them out of the starting lineup or restricting their minutes on the field.

Additionally, in these cycles there are usually one or two critical moments where only one day separates matches. This significantly compromises the recovery process, meaning that players in the compensatory group should only engage in a low-load, moderate-density training session.

When three matches are played over a nine-day period (Table 6), the presence of two rest days between games allows for a less compromised recovery process. However, this schedule does not justify relaxing the previously established recommendations. Therefore, a range of 2 to 2.5 CU accumulated over three matches (including the one played with their club) is recommended.

This type of cycle is particularly common in UEFA development tournaments (U-15 and U-16) as well as in qualification and elite tournaments (U-17 and U-19).

**Table 4. Training camp 7 days and 3 matches**

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
MD+1/-2	MD+2/-1	GAME	MD+1/MD-1	GAME	MD+1/MD-1	GAME
Recovery - Optimization	Recovery - Activation	Competition	Recovery - Activation	Competition	Recovery - Activation	Competition

**Table 5. Training camp 8 days and 3 matches**

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY	MONDAY
MD+1/-2	MD+2/-1	GAME	MD+1/MD-1	GAME	MD+1/-2	MD+2/-1	GAME
Recovery - Optimization	Recovery - Activation	Competition	Recovery - Activation	Competition	Recovery - Optimization	Recovery - Activation	Competition

**Table 6. Training camp 9 days and 3 matches**

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY	MONDAY	TUESDAY
MD+1/-2	MD+2/-1	GAME	MD+1/-2	MD+2/-1	GAME	MD+1/-2	MD+2/-1	GAME
Recovery - Optimization	Recovery Activation	Competition	Recovery - Optimization	Recovery Activation	Competition	Recovery - Optimization	Recovery Activation	Competition

**MEDIUM CYCLE. 10 Days-2 Matches (FIFA Window)**

This 10-day cycle with two matches is typically characteristic of FIFA international windows for the U-21 category. It represents the most similar competitive dynamic to what players experience at their clubs (Table 7).

This cycle, due to its lower competitive density, allows for better recovery for players who have accumulated significant minutes with their club the previous weekend, as well as after the first match with the national team (habitually played on a Friday). As there is more available time for both individual and team training, optimizing performance at both levels becomes more manageable.

During the first two days of the training camp, up to three different types of sessions may be scheduled. For example, on the first day, the following session types can be implemented:

- (i) A **MD-4** session for players who did not play with their club or had limited minutes over the previous weekend.
- (ii) A **MD+2** session for those who played with their club on Saturday.
- (iii) A **MD+1** session for players who competed on Sunday.

Additionally, individual recommendations from the clubs should be considered to tailor training and recovery programs of the players. Since this cycle does not involve a high competitive density, there is no restriction on individual match participation, provided that recovery processes are carried out optimally.

**Table 7. Training camp 10 days and 2 matches**

MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY	MONDAY	TUESDAY
MD+1+2/-4	MD +2/-3	MD -2	MD -1	GAME	MD +1/-3	MD +2/-2	MD -1	GAME
Recovery - Implementation	Recovery - Optimization	Optimization	Activation	Competition	Recovery - Optimization	Recovery - Optimization	Activation	Competition

**LONG CYCLE (European Championships, Olympic Games, and FIFA World Cup)**

Regardless of the category of the players (U-17, U-19, U-20, U-21, or U-23/Olympic), this type of training camp consists of two clearly defined phases: a preparation and a competition phase.

The duration of the preparation phase can vary, ranging from **7 to 10 days** in the younger categories, to **15 to 20 days** for the U-21 and Olympic teams. This initial phase extends from the start of the training camp until the departure to the competition venue. As previously mentioned, the timing of the season in which the competition takes place significantly influences this preparation phase.

Each period and category presents its own unique characteristics and inherent challenges. If the competition takes place at the beginning of the pre-season (such as the UEFA Under-19 Championship or the Olympic Games), the players arrive after their vacation period, making monitoring and assess-

ing their fitness levels more complex. Another challenge at this stage is the limited preparation time, as both the physical conditioning of the players and the collective tactical aspects must be addressed within a very short timeframe (10-12 days) in comparison to a conventional club pre-season (4-6 weeks). To effectively manage these two aspects, a methodology that integrates all objectives is required (Campos-Vázquez and Jiménez-Iglesias 2024), with session types differing slightly from those used at other points of the season.

In contrast, if the competition takes place at the end of the season (such as the UEFA Under-17 and Under-21 Championships), the situation is entirely different. Most players arrive after competing for more than 10 months, having played, in some cases, over 60 matches, which represents an average of almost 1.5 matches per week throughout the season.

Finally, tournaments such as the FIFA U-17 and U-20 World Cups, which take place after the season has already started in

Spain (September, October, or November), probably represent the most favourable scenario. At this stage, players have not yet accumulated a great competitive workload and can benefit from being in good physical condition as they are already in the competitive period.

Regarding the competition dynamics in these tournaments, once the first match is played the subsequent cycles typically follow a repeating pattern, with matches scheduled every three days. If a team reaches the final they will have played between five and seven matches (three in the group stage and two to four in the knockout rounds, including the round of 16, quarterfinals, semifinals, and final) in less than three weeks.

**Recommendations for long cycles**

- Whenever the competition format allows, having two players per position is highly recommended. If this is not possible, selecting versatile players becomes essential, as well as understanding which positions within the game model de-

mand the highest physical exertion throughout such a long tournament.

- Following the CU and wellness guidelines established in the previous sections, some adjustments are necessary depending on the tournament schedule (early or late season). Competitions at the end of the season demand stricter compliance with these recommendations.
- Considering certain contextual factors in the planning process, especially for World Cups and the Olympic Games, such as travel duration, time zone differences, local customs, climate, and dietary conditions in the host country (Zouhal et al. 2022).
- Emphasizing recovery routines, making full use of all available resources (ice therapy, mobility work, physiotherapy, rest, hydration, nutrition, etc.) (Altarriba-Bartes et al. 2021).

Table 8 provides a summary of the main characteristics of the different types of cycles discussed in this section.

**Table 8. Characteristics of the Different Types of Training Camps and Microcycles in the Context of Youth National Teams**

Microcycle	Duration	Training Days	Number of Games (g)	Competition Units (CU) Recommendations	Competition Units (CU) Club	Session Types
Short 3	3d	2d	1g	RPE>8 & Well<20: max 0,5 CU	0,7 CU Sat - 0,5 CU Sun 0,7 CU Sun	MD+1/MD-2 MD+2/MD-1
Short 4	4d	2d	2g	1,25 CU in 2g (48 hours) 2 CU in 3g (5 days) CU >0,5 & RPE>8: max 1CU in 2g	1,25 CU in 2g (48 hours)	MD+1/MD-1
Short 5	5d	3d	2g	1,25 CU in 2g (48 hours) 2 CU in 3g (5 days) RPE>8 & Well<20: max 0,5 CU	1,25 CU in 2g (48 hours)	MD+1/MD-2 MD+2/MD-1 MD+1/MD-1
Medium 7-9	7d-9d	4d-6d	3g	2 - 2,5 CU in 3g CU>0,5 & RPE>8: CU <0,7 Well<20 load adjustment	Ratio 2-2,5 CU in 3g	MD+1/MD-2 MD+2/MD-1 MD+1/MD-1
Medium 10	10d	6d-7d	2g	No limitation of CU in 2g Personal adjustment club & national team		MD+1/MD-4 MD+2/MD-3 MD-2/MD-1
Long >10	10d+	6d+	3g+	2 CU every 3g CU >0,5 & RPE>8: CU <0,7 Well<20 load adjustment		MD+1/MD-2 MD+2/MD-1

**Key Findings and Recommendations**

After gaining a detailed understanding of the competitive context of the youth teams of the Spanish Football Association, this section presents the measures implemented by the Physical Preparation Department to address the complexity of these scenarios.

- Conduct a detailed analysis of the individual status of every player at the start of the training camp, considering accumulated minutes over the weekend, reported RPE, external load, travel duration and type, sleep hours, and other relevant factors.

- Determine the number of Competition Units (CU) accumulated by the players at their clubs in the weeks leading up to the training camp.
- Establish a maximum CU volume for each type of microcycle.
- Prioritize professional intervention during the training camps by focusing on recovery processes, implementing both the protocols designed by the Physical Preparation Department and the individualized strategies provided by clubs.

- Emphasize the importance of following the individual routines (prevention and/or reinforcement-optimization programs), which are communicated by their clubs before the training camp.
- Closely monitoring the training and competition load during the cycle and tournament. Contextually analyse the external load accumulated in each match and over the course of the tournament, as this data is essential for individualized load management.
- Consider the phase of the annual plan in which the training camp takes place when designing training contents, particularly when planning the distribution of the training loads.

## References

1. Altarriba-Bartes, Albert, Javier Peña, Jordi Vicens-Bordas, Martí Casals, Xavier Peirau, and Julio Calleja-González. 2021. "The Use of Recovery Strategies by Spanish First Division Soccer Teams: A Cross-Sectional Survey." *Physician and Sportsmedicine* 49(3). doi:10.1080/00913847.2020.1819150.
2. Bordonau, Juan, and José Alberto Méndez-Villanueva. 2018. *Tactical Periodization. A Proven Successful Training Model.* Soccer Tutor.
3. Bradley, Paul S. 2024a. "'Setting the Benchmark' Part 1: The Contextualised Physical Demands of Positional Roles in the FIFA World Cup Qatar 2022." *Biology of Sport* 41(1). doi:10.5114/biol sport.2024.131090.
4. Bradley, Paul S. 2024b. "'Setting the Benchmark' Part 2: Contextualising the Physical Demands of Teams in the FIFA World Cup Qatar 2022." *Biology of Sport* 41(1). doi:10.5114/biol sport.2024.131091.
5. Campos-Vázquez, Miguel Ángel, and José Jiménez-Iglesias. 2024. *Periodización Integral. Un Modelo Holístico Para El Fútbol Actual: De La Sala al Campo.* Granada.
6. Carling, Christopher, Alan McCall, Franck Le Gall, and Gregory Dupont. 2015. "The Impact of In-Season National Team Soccer Play on Injury and Player Availability in a Professional Club." *Journal of Sports Sciences* 33(17): 1751-57. doi:10.1080/02640414.2015.1013051.
7. Casamichana, David, Julen Castellano, Antonio Gómez Díaz, and Andrés Martín-García. 2019. "Looking for Complementary Intensity Variables in Different Training Games in Football." *J Strength Cond Res* 5: 1-8.
8. Clemente, Filipe, Guglielmo Pillitteri, Luiz H. Palucci Vieira, Alireza Rabbani, Piotr Zmijewski, and Marco Beato. 2024. "Balancing the Load: A Narrative Review with Methodological Implications of Compensatory Training Strategies for Non-Starting Soccer Players." *Biology of Sport*. doi:10.5114/biol sport.2024.139071.
9. Delgado-Bordonau, J., and A. Mendez-Villanueva. 2012. "Tactical Periodization: Mourinho's Best-Kept Secret." *Soccer Journal*, 57(3).
10. Djaoui, Léo, Adam Owen, Matt Newton, Pantelis Theodoros Nikolaidis, Alexandre Dellal, and Karim Chamari. 2022. "Effects of Congested Match Periods on Acceleration and Deceleration Profiles in Professional Soccer." *Biology of Sport* 39(2). doi:10.5114/BIOLSPORT.2022.103725.
11. Ekstrand, Jan, Daniel Lundqvist, Michael Davison, Michel D'Hooghe, and Anne Marte Pensgaard. 2019. "Communication Quality between the Medical Team and the Head Coach/Manager Is Associated with Injury Burden and Player Availability in Elite Football Clubs." *British Journal of Sports Medicine* 53(5): 304-8. doi:10.1136/bjsports-2018-099411.
12. Foster, Carl, Lisa L. Hector, Ralph Welsh, Mathew Schrager, Megan A. Green, and Ann C. Snyder. 1995. "Effects of Specific versus Cross-Training on Running Performance." *European Journal of Applied Physiology and Occupational Physiology* 70(4). doi:10.1007/BF00865035.
13. Francioni, Fabio Massimo, Antonio Jose Figueiredo, Corrado Lupo, Daniele Conte, Laura Capranica, and Antonio Tessitore. 2016. "Preseason Strategies of Italian First League Soccer Clubs in Relation to Their Championship Ranking: A Five-Year Analysis." *Journal of Human Kinetics* 50(1). doi:10.1515/hukin-2015-0151.
14. Gómez-Díaz, Antonio, Fábio Yuzo Nakamura, Pedro Menezes, João Barreira, Pedro Figueiredo, and Diogo Coutinho. 2024. "Characterizing Microcycles' Workload When Combining Two Days Structure within Single Training Sessions during Congested Fixtures in an Elite Male Soccer Team." *Biology of Sport*. doi:10.5114/biol sport.2024.132992.
15. De Hoyo-Lora, Moisés, and Luis Suárez-Arrones. 2022. "Programming and Periodization for Team Sports." In *Resistance Training Methods. From Theory to Practice*, ed. Alejandro Muñoz-López. Springer, 237-58.
16. Kelly, Vincent G., and Aaron J. Coutts. 2007. "Planning and Monitoring Training Loads During the Competition Phase in Team Sports." *Strength and Conditioning Journal* 29(4). doi:10.1519/1533-4295(2007)29[32:pamtlld]2.0.co;2.
17. Lastella, Michele, Gregory D. Roach, and Charli Sargent. 2019. "Travel Fatigue and Sleep/Wake Behaviors of Professional Soccer Players during International Competition." *Sleep Health* 5(2). doi:10.1016/j.sleh.2018.10.013.
18. Lopategui, Ibai Guridi, Julen Castellano Paulis, and Ibon Echeazarra Escudero. 2021. "Physical Demands and Internal Response in Football Sessions According to Tactical Periodization." *International Journal of Sports Physiology and Performance* 16(6). doi:10.1123/ijsp.2019-0829.
19. Marín, Kévin, and Julen Castellano. 2023. "Two Periodization Strategies in Professional Football and Their Influence on Accumulated Training Load and Its Distribution: Differences between Starters and Non-Starters." *Journal of Sports Sciences* 41(24). doi:10.1080/02640414.2024.2318061.
20. Martín-García, Andrés, Antonio Gómez Díaz, Paul S. Bradley, Francesc Morera, and David Casamichana. 2018. "Quantification of a Professional Football Team's External Load Using a Microcycle Structure." *Journal of Strength and Conditioning Research* 32(12). doi:10.1519/jsc.0000000000002816.
21. Martín-García, Andrés, Antonio Gómez-Díaz, Paul S. Bradley, Francesc Morera, and David Casamichana. 2016. *QUANTIFICATION OF A PROFESSIONAL FOOTBALL TEAM'S EXTERNAL LOAD USING A MICROCYCLE*

STRUCTURE. <https://journals.lww.com/nsca-jscr>.

**22.** McLean, Blake D., Aaron J. Coutts, Vince Kelly, Michael R. McGuigan, and Stuart J. Cormack. 2010. "Neuromuscular, Endocrine, and Perceptual Fatigue Responses during Different Length between-Match Microcycles in Professional Rugby League Players." *International Journal of Sports Physiology and Performance* 5(3). doi:10.1123/ijsp.5.3.367.

**23.** Modric, Toni, Sime Versic, Paweł Chmura, Marek Konefal, Marcin Andrzejewski, Igor Jukic, Patrik Drid, Suncica Pocek, and Damir Sekulic. 2022. "Match Running Performance in UEFA Champions League: Is There a Worthwhile Association with Team Achievement?" *Biology* 11(6). doi:10.3390/biology11060867.

**24.** Mujika, Inigo, Shona Halson, Louise M. Burke, Gloria Balagué, and Damian Farrow. 2018. "An Integrated, Multifactorial Approach to Periodization for Optimal Performance in Individual and Team Sports." *International Journal of Sports Physiology and Performance* 13(5). doi:10.1123/ijsp.2018.0093.

**25.** Nobari, Hadi, Rodrigo Aquino, Filipe Manuel Clemente, Mousa Khalafi, Jose Carmelo Adsuar, and Jorge Pérez-Gómez. 2020. "Description of Acute and Chronic Load, Training Monotony and Strain over a Season and Its Relationships with Well-Being Status: A Study in Elite under-16 Soccer Players." *Physiology and Behavior* 225. doi:10.1016/j.physbeh.2020.113117.

**26.** Nobari, Hadi, Maryam Fani, Elena Pardos-Mainer, and Jorge Pérez-Gómez. 2021. "Fluctuations in Well-Being Based on Position in Elite Young Soccer Players during a Full Season." *Healthcare (Switzerland)* 9(5). doi:10.3390/healthcare9050586.

**27.** Pillay, L., D. Burgess, D. C. Janse van Rensburg, G. M. Kerkhoffs, and V. Gouttebauge. 2022. "The Congested International Match Calendar in Football: Views of 1055 Professional Male Players." *BMC Sports Science, Medicine and Rehabilitation* 14(1). doi:10.1186/s13102-022-00597-w.

**28.** Saidi, Karim, Hassane Zouhal, Daniel Boulosa, Gregory Dupont, Anthony C. Hackney, Benoit Bideau, Urs Granacher, and Abderraouf Ben Abderrahman. 2022. "Biochemical Markers and Wellness Status During a Congested Match Play Period in Elite Soccer Players." *International Journal of Sports Physiology and Performance* 17(4). doi:10.1123/ijsp.2020.0914.

**29.** Shafizadeh, Mohsen, Marc Taylor, and Carlos Lago Peñas. 2013. "Performance Consistency of International Soccer Teams in Euro 2012: A Time Series Analysis." *Journal of Human Kinetics* 38(1). doi:10.2478/hukin-2013-0061.

**30.** Stevens, Tom G.A., Cornelis J. de Ruiter, Jos W.R. Twisk, Geert J.P. Savelsbergh, and Peter J. Beek. 2017. "Quantification of In-Season Training Load Relative to Match Load in Professional Dutch Eredivisie Football Players." *Science and Medicine in Football* 1(2). doi:10.1080/24733938.2017.1282163.

**31.** Szigeti, Gyorgy, Gabor Schuth, Peter Revisnyei, Alija Pasic, Adam Szilas, Tim Gabbett, and Gabor Pavlik. 2022. "Quantification of Training Load Relative to Match Load of Youth National Team Soccer Players." *Sports Health* 14(1). doi:10.1177/19417381211004902.

**32.** Tarragó, J. R., Marcel·lí Massafret-Marimón, Francisco Seirul-lo, and Francesc Cos. 2019. "Entrenamiento En Deportes de Equipo: El Entrenamiento Estructurado En El FCB." *Apunts Educación Física y Deportes* (137). doi:10.5672/apunts.2014-0983.es.(2019/3).137.08.

**33.** Vanrenterghem, Jos, Niels Jensby Nedergaard, Mark A. Robinson, and Barry Drust. 2017. "Training Load Monitoring in Team Sports: A Novel Framework Separating Physiological and Biomechanical Load-Adaptation Pathways." *Sports Medicine* 47(11). doi:10.1007/s40279-017-0714-2.

**34.** Vardakis, Lazaros, Yiannis Michailidis, Panagiotis Topalidis, Charalambos Zelenitsas, Athanasios Mandroukas, Ioannis Gissis, Kosmas Christoulas, George Mavrommatis, and Thomas Metaxas. 2023. "Application of a Structured Training Plan on Different-Length Microcycles in Soccer—Internal and External Load Analysis between Training Weeks and Games." *Applied Sciences (Switzerland)* 13(12). doi:10.3390/app13126935.

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