



FACULDADE DE DESPORTO
UNIVERSIDADE DO PORTO

**DISTRIBUTION OF TRAINING EXTERNAL AND
INTERNAL LOAD THROUGHOUT THE WEEK IN
SOCCER: A SYSTEMATIC REVIEW AND META-
ANALYSIS**

André Daniel Araújo Milheiro

Porto. 2020



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Dissertation presented with a view to obtaining the 2nd cycle in Sports Training, with specialization in High Performance Training, from the Faculty of Sports of the University of Porto (Decree-Law nº 74/2006, of 24 March, in the wording given by Decree-Law 65/2018 of August 16).

Supervisor: Professor Doutor António Natal Rebelo

Co-supervisor: Professor Doutor João Renato Silva

André Daniel Araújo Milheiro

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To my girlfriend, Daniela Carvalho

“Essa miúda realiza tudo o que eu desejar

Porque ela sabe o que eu desejo sem eu ter de falar

*Eu já não estou a gostar ou estou a gostar demais
Tão bom não dura pa' sempre
Por favor diz que não vais
Que não saís
Do meu lado
Porque eu agora já estou mais que habituado...
Tu és a miúda que me faz
Correr pelos meus sonhos sem olhar pra trás
Se for pa' bazar vamos
Viver a vida sem planos"*

Music from Domingues – “*Fica*”

I have no words to describe everything you did and do for me. Without a doubt I have become a better person and I hope to continue to be by your side in all the victories that life will bring us.

“O sucesso é um percurso, não um destino” - FADEUP

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Resumo

Introdução: A manipulação de cargas de treino é um aspeto fundamental na otimização do rendimento desportivo em futebol, visto estar estreitamente associada à performance e risco de lesão do jogador. Por essa razão, a monitorização da carga externa e interna de treino é um procedimento habitual no futebol profissional, pois permite caraterizar o stress experienciado pelos jogadores nos treinos e jogos. Dado que os jogadores de futebol de elite competem semanalmente, dosear ajustadamente a intensidade e volume de treino afigura-se de importância central na preparação para cada jogo.

Objetivo: Os objetivos desta revisão sistemática foram i) descrever as cargas de treino externa e interna a que os jogadores são expostos durante o microciclo competitivo (treino e jogo); ii) quantificar a magnitude da relação entre a carga de treino e de jogo; e iii) calcular a magnitude da relação entre a carga de treino experienciada em diferentes momentos do microciclo (dias tipicamente considerados de *aquisição* vs. dias de *recuperação* vs. dias *pré-jogo*). Esta revisão pretende responder a estas questões através de uma análise grupal (equipa) e individual (de acordo com a posição dos jogadores em campo).

Métodos: A pesquisa bibliográfica foi realizada nas bases de dados *PubMed*, *Scopus*, *EbscoHost* e *Web of Science*, até ao final de dezembro de 2019. Os critérios de inclusão foram: jogadores profissionais de futebol masculinos, com mais de 18 anos, com participação regular na maioria das sessões de treino (no mínimo 80%) e com pelo menos 45 minutos de tempo de jogo em cada partida oficial; informação disponível sobre as cargas de treino externa e interna durante a semana de treino e jogos, extraída num período com duração mínima de duas semanas e com pelo menos quatro dias de treino anteriores ao jogo; informação sobre a média e desvio padrão ou possibilidade da sua extração das figuras; semanas de treino não congestionadas (2 jogos por semana); periódicos com revisão por pares e publicados em inglês.

Resultados: Doze estudos foram incluídos ($n = 251$ jogadores). As métricas de carga externa distância total (DT), corrida de muita alta velocidade (corrida_{MAV}) e distância percorrida em sprinte e de carga interna baseada em índices percentuais (percepção subjetiva de esforço; PSE) têm sido os indicadores mais utilizados para caracterizar a carga de treino durante o microciclo competitivo, ao nível grupal e individual. Durante o microciclo, a carga de treino aumenta gradualmente até J-4 e J-3 (96 e 72 horas antes do jogo), diminuindo de seguida até ao dia J-1 (24h antes do jogo). A carga semanal (somatório das diferentes sessões de treino) referente à DT, à corrida de alta intensidade (corrida_{AI}), à velocidade (corrida_{AV}) e à PSE revelou-se superior à do jogo. No entanto, os valores de jogo de corrida_{MAV} e de distância percorrida em sprinte foram superiores aos da carga de treino semanal. Na análise da CT individual nos diferentes dias do microciclo, apenas foram encontradas diferenças na DT percorrida entre unidades de treino *aquisição* e de *pré-jogo* (ex. J-3 vs. J-1).

Conclusão: O jogo de futebol é um estímulo fundamental para a manutenção / melhoria da capacidade do jogador para realizar deslocamentos nas zonas de muita alta intensidade. No que se refere à análise das diferentes sessões de treino, o treino realizado 72 horas antes do jogo (J-3) parece ser o treino em que se verificam valores de carga externa mais elevados (ex. DT, corrida_{MAV}, desaceleração_{Alta}). Nas sessões de treino subsequentes, observa-se uma diminuição da carga de treino (J-2 e J-1) até ao dia de jogo, especialmente no dia anterior ao jogo (J-1). No entanto, no que diz respeito aos parâmetros de corrida_{MAV} e de distância percorrida em sprinte, os valores acumulados no microciclo de treinos não atingem os valores registados em jogo (97% e 91%, respetivamente).

Palavras Chave: PERFIL DA CARGA, PERIODIZAÇÃO, TEMPO-MOVIMENTO, PERCEÇÃO SUBJETIVA DE ESFORÇO, FREQUÊNCIA CARDÍACA.

Abstract

Introduction: The manipulation of training loads (TL) is a fundamental objective in the optimization of sports performance in football, since it is closely associated with the player's performance and risk of injury. For this reason, the monitoring of external (EL) and internal training load (IL) is a common procedure in professional football, as it allows the characterization of stress experienced by players in training and games. As elite football players compete weekly, they can adjust the intensity and volume of training associated with the central importance of preparation for each game.

Objective: The objectives of this systematic review were i) to describe the EL and IL to which the players are exposed during the competitive microcycle (training and game); ii) quantify the magnitude of the relationship between training and game load; and iii) calculate the magnitude of the relationship between the TL experienced at different moments of the microcycle (days typically considered for acquisition vs. recovery days vs. pre-game days). This review aims to answer these questions through a group (team) and individual analysis (according to the position of the players on the field).

Methods: The bibliographic search was carried out in the PubMed, Scopus, EbscoHost and Web of Science databases, until the end of December 2019. The inclusion criteria were: i) professional male soccer players, over 18 years old, with regular participation in most training sessions (at least 80%) and with at least 45 minutes of playing time in each official match; ii) information available on the EL and IL during the training week and games, extracted in a period with a minimum duration of two weeks and with at least four training days before the game; iii) information about the mean and standard deviation or the possibility of its extraction from the figures; iv) non-congested training weeks (2 games per week); v) peer-reviewed journals published in English.

Results: Thirteen studies were included (n = 251 players). The EL metrics, total distance (TD), very high speed running (VHSR) and sprint distance and IL metrics based on perceptual indices (Rating perception of effort; RPE) have been the most used indicators to characterize the TL during the competitive microcycle, both at group and individual level. During the microcycle, the TL gradually increases until M-4 and M-3 (96 and 72 hours before the game), then decreasing until day M-1 (24h before the game). The weekly load (sum of the different training sessions) referring to the TD, the high intensity running (HIR), high speed running (HSR) and the RPE showed to be higher than the performed during the game. However, the game values for VHSR and sprint distance were higher than the weekly training load. In the analysis of the individual TL in the different days of the microcycle, only differences were found in the TD covered between acquisition and pre-game training units (e.g. M-3 vs. M-1).

Conclusion: The soccer game is a fundamental stimulus for the maintenance / improvement of the player's ability to perform very high intensity activities. Regarding the analysis of the different training sessions, the training carried out 72 hours before the game (M-3) seems to be the training in which higher EL values are examined (e.g. TD, VHSR, deceleration_{high}). In subsequent training sessions, there is a decrease in the TL (M-2 and M-1) until the game day, especially on the day before the game (M-1). However, about the parameters VHSR and sprint distance, the values accumulated in all training sessions training cycle did not reach the values recorded in the game (97% and 91%, respectively).

Keywords: LOAD PROFILE, PERIODIZATION, TIME-MOVEMENT, SUBJECTIVE PERCEPTION OF EFFORT, HEART RATE.

List of abbreviations

Δ	Percentage of variation
%aj	Percentage adjusted to the sample
a.u.	Arbitrary units
Acc	Acceleration
amp	Amplitude
AMP	Average metabolic power
CD	Central defender
CF	Central forward
CI	Confidence interval
cm	Centimeters
CM	Central midfielder
CK	Creatina kinase
Dec	Deceleration
DHML	Distance at high metabolic load
ED	Equivalent Distance
EL	External load
ES	Effect size
QA	Qualitative assessment
<i>g</i>	Effect size (<i>g</i> de <i>Hedges</i>);
GPS	Global Positioning System
h	Hour
HIR	High intensity running

HR	Heart rate
HR _{máx}	Maximum heart rate
HSR	High speed running
I^2	Value of heterogeneity
IL	Internal load
kg	Body Mass
Km	Kilometers
LIR	Low intensity running
LSR	Low speed running
m	Meters
M	Match day
M+1	One days after the match
M+2	Two days after the match
M-4	Four days before the match
M-3	Three days before the match
M-2	Two days before the match
M-1	One days before the match
Min	Minutes
MIR	Moderate intensity running
MSR	Moderate speed running
N	Number
NI	No information
NE	Number of efforts
NIH	<i>National heart blood institute</i>

NS	Number of sprints
P	Percentages
PL	Player load
PICOS	<i>Population-Intervention-Comparators-Outcomes-Study</i>
PRISMA	<i>Preferred reporting items for systematic reviews and meta-analyses statement</i>
r	Correlation value
RPE	Rating perceived of effort
s	Second
S	Sample
Sat	Saturday
SE	<i>Successful elite</i>
SD	Standard deviation
Std	Studies
Sun	Sunday
TD	Total distance
TRIMP	Training impulse
TL	Training Load
V _{Ave}	Average velocity
V _{max}	Maximum velocity
VHIR	Very high intensity running
VHSR	Very high speed running
VLIR	Very low intensity running

WD	Wide Defender
WM	Wide midfielder
WCE	<i>World class elite</i>
X	mean

1. Introduction

In high-performance sports, the goal of periodization is to manipulate the training load in order to develop and maximize players competitive performance (*Los Arcos et al., 2017*). The training load is usually represented by the external load and the internal load. The external load is defined as the work performed by the athlete during training or game (e.g. distance covered, number of sprints) and the internal load is associated with the physiological response to that same external load (e.g. heart rate, perceived effort) (*Wallace et al., 2014*). The simultaneous monitoring of external and internal loads is a procedure widely used in professional football, as it allows a better characterization of the individual stress experienced by each player (*Scott et al., 2013*). Additionally, there is a consensus that this information assists coaches in improving players performance and reduce the risk of injury in team sports (*Coutinho et al., 2015; Gómez-Carmona et al., 2019; António Rebelo et al., 2012; Tomazoli et al., 2020*); there is evidence of a relationship between training load and performance and risk of injury (*António Rebelo et al., 2012; Stevens et al., 2017*).

The training monitoring process must incorporate a macro (team centred) and a micro structural aspect (player centred). The distinctive tasks and functions inherent to each individual player role (e.g. midfielder vs fullback) may result in large intra- and interindividual variability in specific locomotor activities (e.g. high intensity running) during training exercises and competition (*Akubat et al., 2012; Franco M Impellizzeri et al., 2005; Los Arcos et al., 2015; Manzi et al., 2013*). This variability also extends to the internal load experienced by each player, since, for the same external load, great differences in the physiological stress experienced by each athlete can be observed (*Jaspers et al., 2017*). Thus, within the same team, considerable differences in training load (external and / or internal) between players can be observed (*Akubat et al., 2012; Franco M Impellizzeri et al., 2005; Los Arcos et al., 2015; Manzi et al., 2013*).

In the last decade several technological advances took place that allowed the emergence of new devices for monitoring external (e.g. global positioning systems; GPS) and internal load (e.g. heart rate telemetry). These technological advances confirmed improved accuracy and reliability (*Achten & Jeukendrup, 2003; Akenhead et al., 2014; Alberts et al., 2015; Bastida Castillo et al., 2018*).

and contributed to the widespread use in soccer, as it provides practitioners with an estimate of the external load to which players have been subjected during training and competition (Anderson et al., 2016; Buchheit & Simpson, 2017; Gaudino et al., 2015; Mohr et al., 2008). This type of analysis allows, among other parameters, to collect information related to the distances covered at different speeds (e.g. sprint distance) and to characterize the changes in running kinetics (e.g. accelerations and decelerations) (Buchheit & Simpson, 2017). More recently, the emergence of specific algorithms has allowed the development of new analysis parameters, such as, the *Player Load*TM (Boyd et al., 2011). However, the analysis of this metrics tends to be complex, because different companies use different algorithms to classify actions, which limits the comparison of results from different studies (Malone et al., 2017).

With regard to the physiological component, the internal load is usually quantified by heart rate (HR) indices (Wallace et al., 2014) or perceived effort (RPE) (Foster et al., 2001). Several methods for quantifying internal load based on cardiac indices have been proposed (Borresen & Lambert, 2008). Training impulse (TRIMP), roughly defined by the product of an athlete's heart rate during exercise/training for the duration of the same (Borresen & Lambert, 2008), allows to measure the training and competition load in sports of intermittent nature (Hopkins, 1991; Stagno et al., 2007). The HR added zones method, proposed by Edwards (1994), it can allow a greater detail of the quantification of the internal training load, because it divides and quantifies the load into five zones of relative intensity.

The sRPE was developed with the aim of replace other more complex objective measures of internal training load (e.g. heart rate) (Borresen & Lambert, 2008). Thus, sRPE has been widely used to quantify the training load in football (Akubat et al., 2012; Alexiou & Coutts, 2008; Algroy et al., 2011; Impellizzeri et al., 2004; F. M. Impellizzeri et al., 2005; Jeong et al., 2011; Lago et al., 2010; Malone et al., 2015). The intensification of its use is related to its simplicity, cost and versatility (Los Arcos et al., 2016), in addition to correlating with different physiological parameters (heart rate, blood lactate concentrations and VO₂) (Chen et al., 2002). Furthermore, the sRPE provides a more holistic indication of the global internal load, because it aggregates the global stress experienced

during training or matches (psychological and physiological) in a single parameter (A. Rebelo et al., 2012).

The knowledge of the training load (external and internal) to which the players are submitted allows to protect athletes from high levels of acute (when unwanted) and chronic fatigue (Djaoui et al., 2017; Jaspers et al., 2017; Malone et al., 2015; Nédélec et al., 2012; Stevens et al., 2017). In fact, these information allows a better understanding of the physical and physiological requirements of the game and training and thus better understand their specificities (Little, 2009; Turner & Stewart, 2014). Recently, sports scientists have begun to describe the daily (according to the specific day of the microcycle) and weekly loading pattern of elite football teams (Akenhead et al., 2016; Anderson et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Malone et al., 2015; Stevens et al., 2017). These studies describe the training load during specific periods of the season of different duration, such as: moderate (2 to 8 weeks) (Algroy et al., 2011; Filipe Manuel Clemente, Adam Owen, et al., 2019; Jeong et al., 2011; Manzi et al., 2013; Owen A et al., 2019; A. L. Owen et al., 2017), large (13 to 16 weeks) (Azcárate et al., 2018; Grunbichler et al., 2019) or very large duration (competitive season) (Akenhead et al., 2016; Anderson et al., 2016; Brito et al., 2016; Casamichana et al., 2013; Gaudino et al., 2013; Kelly et al., 2019; Los Arcos et al., 2017; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Scott et al., 2013; Thorpe et al., 2016). However, a complete characterization of the training load experienced during a competitive microcycle throughout the soccer season in elite professional players is limited (Gaudino et al., 2013). Likewise, most studies provide only information on session duration, sRPE data and some external load metrics. Although these studies provide relevant information, more comprehensive studies are needed on the periodization practices adopted by professional teams (Weston, 2018). Finally, the literature is inconclusive about establishing differences in training load for different specific positions on the field, although these differences seem to be evident during competition (Bradley et al., 2010; Malone et al., 2015). Consequently, there is a need for a systematic analysis of the studies that investigated the training load distribution during the competitive microcycle and, if possible, to test an integration of the results of different independent studies (meta-analysis).

Thus, the objectives of this systematic review with meta-analysis were i) describe the external and internal training load during the competitive microcycle (training and game); ii) determine the magnitude of the relationship between competition and training sessions and within the distinctive training sessions of the microcycle. This systematic review aims to answer these questions through a group (team) and individual analysis (according to the position of the players on the field).

2. Methods

2.1 Eligibility criteria

This systematic review and meta-analysis was conducted according to the recommendations defined in the “Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement” (PRISMA) statement and the study design followed the “Population-Intervention-Comparators-Outcomes-” approach Study (PICOS) (Moher et al., 2010). The PICOS approach to this investigation can be detailed as follows: Population: soccer players over 18, with regular participation in most training sessions (at least 80%) and at least 45 minutes in each official match; Intervention: describe the training load on non-congested competitive microcycles; Comparison: team and position specific changes in training load between training sessions, and between training days and official match; Results: external (e.g. player’s running distance above specific speed thresholds) and internal [(objective (heart-rate derived indices) and subjective (ratings of perception of effort)] load metrics. Study type: Cohort and case studies investigating the training load over the competitive microcycle of professional soccer players.

2.2 Sources of information and research

The selection of studies was performed in two consecutive screening phases. The first phase consisted of identifying articles through systematic search of the PubMed, Scopus, EbscoHost and Web of Science databases, until the end of December 2019. The Boolean search strategy is presented in table 1. The reference lists of all articles were examined to identify further eligible studies. Papers published in the epub ahead of print within the abovementioned time frame were also considered. Two reviewers (AM, JR) independently selected titles and abstracts to identify articles that potentially met the inclusion criteria. For these articles, the full text versions were retrieved and independently examined by these reviewers, to determine whether the identified articles met the inclusion criteria. Any disagreement about the study’s eligibility was resolved by consensus, including a third reviewer (ANR).

Table 1 - Search Strategy in the databases

1. Soccer OR Football
2. Periodization OR Microcycle OR Weekly OR Mesocycle OR “Competition period” OR “In season”
3. “Training Demand*” OR “External load*” OR “Physical demand*” OR “Global positioning system*” OR “GPS” OR “Monitoring” OR “Time- motion” OR “Training Session*” OR “Workload” OR “Match Demand*” OR “Heart rate” OR “TRIMP” OR “RPE*”
4. “Gaelic football” OR “American football” OR “Australian football” OR “Australian Rules”
1 AND 2 AND 3 NOT 4

2.3 Selection of studies and Qualitative Evaluation

A second phase consisted of applying selected inclusion criteria. These inclusion criteria were as follows:

1. The participants were professional male soccer players (> 18 years of age) with regular participation in training (at least 80% of exposure) and at least 45 minutes in each official match;
2. Original studies, published in the English language and in a peer-reviewed journal;
3. Report weekly (≥ 2 weeks) training and/or match external and/or internal training loads. Additionally, studies needed to: i) clear identify the days of the microcycle [e.g. M+1(training session 24 hours post-match), M+2, M-5, M-4, M-3, M-2 and M-1)]; ii) describe at least 4 days of training prior to the game;
4. Non-congested training weeks (e.g. 2 games per week);
5. Report the mean and standard deviation or other information needed to compute the effect size statistic (ES). In the case this data was not reported the study was included if the necessary information could be extracted the from the figures.

When necessary, the authors of the selected articles were contacted (email, social media) to provide information such as: i) mean and standard deviation; ii) better description of the experimental design (e.g. definition of speed limits and sample size for specific variables). Authors were given three weeks to provide the requested information. We determined 11 criteria using the National Heart Blood Institute (NIH) guidelines for qualitative evaluation of observational cohort and cross-sectional studies and before- after (pre-post) studies with no control group. In addition, for the development of the qualitative assessment tool, the following were also considered and analysed: i) other versions of scales currently established and used in sports sciences (e.g. Delphi and PEDro Scale, Newcastle – Ottawa, quality assessment scale, Downs and Black); ii) scales from other systematic studies that answered similar research questions (*Hader et al., 2019; Harper et al., 2019; Silva et al., 2018*); iii) guidelines for monitoring external and internal loads (*Haddad et al., 2017; Impellizzeri et al., 2004; Malone et al., 2017; Saw et al., 2017*). The classification of the level of participants (semi-elite, competitive elite, successful elite, world-class elite) in each study, defined in this paper as “*Eliteness*”, was performed using a modified version of Harper et al. (2019) of the model proposed by Swann et al. (2015). This model was adopted because it allows consistent comparisons to be made between studies (*Swann et al., 2015*). Any discrepancies were resolved by discussion until a consensus was reached before the final classification.

The general methodological quality of the studies was assessed by two independent reviewers (JRS and AM). The cases of disagreement between reviewers regarding the qualitative assessment were resolved through discussion until a consensus was reached. If disagreement persists, a third reviewer verified the data and made the final decision on it (ANR). The qualitative assessment was based on the report of the methods and results of the study, using “yes”, “partial” and “no” answer categories (Table 2). The evaluation results (ranging from 0 to 1) were calculated as follows:

Summary results = [(number of “yes” × 2) + (number of “partial” × 1)] / (number of criteria × 2). The studies were classified as low (<0.50), moderate (0.50-0.75) or high (≥ 0.75) methodological quality (*Kmet et al., 2004*) (Table 2).

Table 2 - Qualitative evaluation criteria.

N°	Items	Score		
		0	1	2
1	Was the main question or objective clearly described? (No or Yes)	No		Yes
2	Was the study population clearly specified and defined (age, gender, training status, stated inclusion/exclusion criteria)? (No, Partly or Yes)	No	Partly	Yes
3	Were different contextual variables specified and described (period of the season, ground surface, environmental conditions) (No, Partly or Yes)	No	Partly	Yes
4	Was the sample size justified? (No or yes)	No		Yes
5	Main measured variables clearly described in the introduction or method section? (No, Partly or Yes)	No	Partly	Yes
6	Was data collection procedures (Same unit for all players and games and preparation of units described for GPS; Familiarization and method of collection for RPE) and signal quality and standard quality guidelines reported (number of satellites > 6, horizontal dilution of precision < 1) (No, Partly or Yes);	No	Partly	Yes
7	Were the EL and/or IL variables clearly defined (thresholds, ranges). (No, Partly or Yes)	No	Partly	Yes
8	Were the validity and reliability of the main variable's measurements discussed? (No, Partly or Yes)	No	Partly	Yes
9	Were the methods (included the statistical methods) sufficiently described to enable the study replication? (No, Partly or Yes)	No	Partly	Yes
10	Does the study provide estimates of the random variability in the data for the main outcomes (i.e. confidence intervals, standard deviations)? (No, Partly or Yes)	No	Partly	Yes
11	Were the study limitations discussed? (No or Yes)	No		Yes

2.4 Independent variables

The results of the selected studies were compiled and extracted by one of the researchers (AM) into a database built for the purpose (Microsoft Excel

Windows 10). A second investigator (JRS) analysed the data collected to avoid possible errors when transferring and analysing the data (*Broman & Woo, 2018*).

- Training session and game: The training sessions of the selected microcycles were categorized using the format “game day more or less”; for example, M+1 and M+2 (one and two days after the match [M]) and M-5, M-4, M-3, M-2 and M-1 (five to one day before the game).
- Players’ positions: The positions were distributed as follows: CD (Central defender), WD (Wide defender), CM (Central midfielder), WM (Wide midfielder), CF (Central Forward).

2.5 Dependent Variables

The dependent variables extracted from the selected studies were allocated to external load and internal load. The categorization of the external load was performed based on the classification of *Gray (Buchheit & Simpson, 2017)*, using three distinct levels:

Level 1: Distances covered at different running speeds (Example: distance covered above 25 km/h⁻¹);

Level 2: Changes in running kinetics: accelerations, decelerations and changes of direction (Example: accelerations above 3 m/s⁻², corresponding to the total distance of 254 m);

Level 3: Events derived from the use of inertial sensors / accelerometers (not available using a video analysis system). Example: impacts above 6 g and Player load in A.U.

However, as pointed by *Hader et al. (2019)*, the external load variables are presented with specific speed and intensity limits for each study and are often defined differently (*Hader et al., 2019*). For example, the sprint distance displacement category was defined as running speed above different limits, according to the study considered: (i) > 24 km/h⁻¹ (*Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019*), (ii) ≥ 24.1 km/h⁻¹ (*Akenhead et al., 2016*), (iii) > 24.4 km/h⁻¹ (*Owen A et al., 2019*) and (iv) > 25.2 km/h⁻¹ (*Anderson et al., 2016; Grunbichler et al., 2019; Martin-Garcia et al., 2018; A. L. Owen et al., 2017*). Thus, as in other studies, the dependent variables were grouped by common speed

zones, based on the thresholds used with elite soccer players (*Akenhead & Nassis, 2016; Hader et al., 2019; Mohr et al., 2010*):

- High speed running (HSR): running intensity between 14.4 – 20.0 km/h⁻¹;
- Very high-speed running (VHSR): running intensity between 19.8 – 25.2 km/h⁻¹;
- Sprint: running speed higher than 24 km/h⁻¹;
- High intensity running (HIR): running speed higher than 14.4 km/h⁻¹;
- Very high intensity running (VHIR): > 19 km/h⁻¹;
- Acceleration: accelerations equal or greater than 1 m·s⁻² (Acceleration_{Total}) and 3 m·s⁻² (Acceleration_{High});
- Deceleration: decelerations lower or equal - 1 m·s⁻² (Deceleration_{Total}) and - 3 m·s⁻² (Deceleration_{High}).

The categorization of the internal load metrics was performed in two distinct dimensions, objective (cardiac indices) and subjective (perceptual responses) and are described below:

Objective: Events related to the time spent in different zones of intensity and training impulse.

- Heart Rate above 90%_{max}: exercise time with HR values above 90% of the maximum heart rate (HR90%_{max});
- Training impulse (TRIMP): the training impulse modified by Stagno et al. (2007) (TRIMP_{MOD}) it was calculated from the raw HR data and the duration of the exercise and allows determining the training load in arbitrary units.

Subjective: session Rating Perceived Effort (sRPE), the internal load calculated from multiplying the total duration of the training or game by the rating of perceived effort (scale 0 to 10) after the training or game (*Foster et al., 2001*).

2.6 Analysis and interpretation of results

The training sessions were categorized according to their location in the microcycle (M+1, M+2, M-5, M-4, M-3, M-2 and M-1). The mean and standard deviation for each load measurement was extracted. In the case the necessary statistics were represented in figures and graphs (and the original data were not made available by the authors), their value was extrapolated using a specific software for the purpose (*webPlotDigitizer*; <https://automeris.io/WebPlotDigitizer/>) (Brito *et al.*, 2016; Kelly *et al.*, 2019). To assess the magnitude of the effect of each study, the percentage of each parameter in relation to the game (Eq. 1) and the percentage of variation between the different training days (Eq. 2) were calculated, using the following equations, respectively:

$$M_{\text{training_A-B}} / M_{\text{Match}} \times 100$$

(Equation 1)

$$[M_{\text{trainingA}} - M_{\text{trainingB}}] / M_{\text{trainingA}} \times 100$$

(Equation 2)

Where, $M_{\text{Training_A-B}}$ represents the average of a specific day of the competitive microcycle (for example, M+1) and M_{Match} the average of the match. In addition, for each outcome a global mean (by time-point and variation between moments) was calculated based on the reported means of the individual studies (Schmitz *et al.*, 2018). This was done assuming that the individuals from each study within the same category belong to the same population (Schmitz *et al.*, 2018). Each global mean was calculated as weighted mean of the individual reported mean, with weights built by the number of subjects per study (Schmitz *et al.*, 2018). In this way, the global values of percentage of each parameter in relation to the game and percentage variation between the different training sessions were calculated (Schmitz *et al.*, 2018).

The results for each outcome variable are presented as the sample size (N), weighted mean percentage (Amplitude: minimum and maximum) and Hedges' *g* value (Tables 3-6). In order to describe and characterize the team and

position specific external and internal load during the competitive microcycle, a meta-analysis was performed. The meta-analysis was performed using the software *Comprehensive meta-analysis software* (Version 3, Biostat, Englewood, NJ, USA). To report the effect size, Hedges' g was adopted, as it implies a correction factor *Hedges (1981); Hedges e Olkin (2014)*. Hedges' g is recommended when are small groups and different in size. The random effects model was adopted because this model considers the heterogeneity of the included studies (*Higgins & Green, 2008*). This model should be adopted when we consider that the studies represent a random sample of a hypothetical population of studies and there is no reason to assume that the real effect is exactly the same in all studies (*Borenstein et al., 2010*). This model was applied when in the presence of a minimum of two studies (*Valentine et al., 2010*). The results are presented as means and 95% confidence intervals (CI). As a result of the studies not reporting the standard deviation of the change between the different moments of the microcycle, nor data that would allow it to calculate [(e.g. CI, standard error or correlation value between two time-points (e.g. M+3 vs. M+4 or Match)], we performed a sensitivity analysis with hypothetical correlation values of $r = 0.3, 0.5$ and 0.7 for calculating ES statistic (Table 4-6) (*Farooq et al., 2020; Higgins, 2011*). However, as in other meta-analytical studies, the values of g used in the discussion are those based on a conservative value of $r = 0.5$ (Table 4-6) (*Farooq et al., 2020; Follmann et al., 1992; Fukuta et al., 2016*). The heterogeneity between the studies was quantified using I^2 statistics (0–40% representing low heterogeneity and 75–100% considerable heterogeneity) (*Higgins, 2011; Higgins et al., 2003*). A significant difference (in bold) was indicated when the 95% confidence interval (CI) of the ES did not overlap to zero (Table 4-6). The limit values for ES were defined as trivial (<0.2), small ($0.2-0.6$), moderate ($0.6-1.2$), large ($1.2-2.0$) and very large (> 2.0) (*Hopkins et al., 2009*). To facilitate data analysis, we decided to structure the results according to the objectives that are typically attributed to the different days of the microcycle: recovery (M+1 and M+2), acquisition (M-5, M-4, M-3 and M-2) and pre-game (M-1) (*Castillo et al., 2019; Martin-Garcia et al., 2018; Silva & Rebelo, 2019*). As such, the different weekly sessions were analysed as follows: i) Training session vs. Match (e.g. M-4 vs. M); ii) Recovery training sessions (e.g. M+1 vs. M+2); iii) Recovery training vs. Acquisition training (e.g. M-4 vs. M+2); iv) Acquisition

training sessions (e.g. M-4 vs. M-3), Acquisition training vs. Pre-game (e.g. M-4 vs. M-1).

3. Results

3.1 Characterization of the studies:

The flowchart of the search and selection process is presented in Fig. 1. All articles found in the four researched databases were exported to a specific software (Endnote X9.2). The initial selection provided 725 results (134 on PubMed, 260 on Scopus, 322 on Web of Science and 9 on EbscoHost). In the manual search, 11 articles with potential interest were selected, resulting in a total of 736 articles. After removing duplicates, 450 records remained. Then, 384 articles were excluded after screening titles and abstract. After applying the selection criteria to the remaining 66 articles, the final sample comprised 13 studies (*Akenhead et al., 2016; Anderson et al., 2016; Brito et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019; Kelly et al., 2019; Los Arcos et al., 2017; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019; A. L. Owen et al., 2017; Thorpe et al., 2016*) (Fig. 1, $n = 275$), of which 12 (*Akenhead et al., 2016; Anderson et al., 2016; Brito et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019; Kelly et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019; A. L. Owen et al., 2017; Thorpe et al., 2016*) were used for the meta-analysis ($n = 251$). All data was extracted by an author (AM) for a customized spreadsheet (Microsoft Excel Windows10) and verified by a second author (JRS). For describe the included studies (Table 3), information concerning the competitive standard (competition and status of players), the length of the investigation period, the instruments (apparatus's and scales) and metrics used to analyse external and internal training load was extracted. Applying the model proposed by Swann et al. (2015), three studies (*Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019; Los Arcos et al., 2017*) were classified as “*successful elite*” ($n = 67$) and 10 studies (*Akenhead et al., 2016; Anderson et al., 2016; Brito et al., 2016; Kelly et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019; A. L. Owen et al., 2017; Thorpe et al., 2016*) were classified as “*world class elite*” ($n = 208$).

Regarding their methodological quality (Table 2), the studies had an average score of 0.71 ± 0.09 (mean $\pm$ standard deviation) for a maximum of one, with a minimum and maximum value of 0.59 and 0.86, respectively. Four studies were classified as high quality (≥ 0.75) and nine of moderate quality (0.5 - 0.75). In this investigation, height external load variables were considered, each of which was allocated to one of the three levels considered, namely:

- Level 1: Total distance (TD, nine studies, $n = 173$) (*Akenhead et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019; Kelly et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019; A. L. Owen et al., 2017*), high speed running (HSR, three studies, $n = 54$) (*Anderson et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019*), very high speed running (VHSR, four studies, $n = 67$) (*Anderson et al., 2016; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; A. L. Owen et al., 2017*), sprint distance (seven studies, $n = 112$) (*Akenhead et al., 2016; Anderson et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; A. L. Owen et al., 2017*), high intensity running (HIR, two studies, $n = 40$) (*Grunbichler et al., 2019; Kelly et al., 2019*) and very high intensity running (VHIR, six studies, $n = 142$) (*Akenhead et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019*).
- Level 2: Acceleration (Acceleration_{Total}, two studies, $n = 56$) (*Akenhead et al., 2016; Owen A et al., 2019*); Acceleration_{High}, two studies, $n = 38$) (*Grunbichler et al., 2019; Martin-Garcia et al., 2018*) and deceleration (Deceleration_{Total}, one study, $n = 33$) (*Akenhead et al., 2016*); Deceleration_{High}, two studies, $n = 38$) (*Grunbichler et al., 2019; Martin-Garcia et al., 2018*)).

- Level 3: Player load (two studies, n= 62) (*Akenhead et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019*) and polar training load (one study, n= 14) (*Grunbichler et al., 2019*).

Regarding internal load, the variable most commonly analysed in the studies was the rating perception of effort (sRPE, six studies, n= 121) (*Brito et al., 2016; Kelly et al., 2019; Los Arcos et al., 2017; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; A. L. Owen et al., 2017; Thorpe et al., 2016*). The other two internal load variables, HR90%_{max} (n= 33) (*Akenhead et al., 2016*) and TRIMP (n= 14) (*Grunbichler et al., 2019*) were considered in only one study. Regarding the independent variables, seven studies (n = 131) (*Anderson et al., 2016; Brito et al., 2016; Grunbichler et al., 2019; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; Thorpe et al., 2016*) reported training and game data with lesser (six studies (*Akenhead et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019; A. L. Owen et al., 2017*)) describing only training outcomes (n= 144). The distribution of studies by type of training session analysed is shown below: M+1 (six studies, n = 139) (*Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019; Los Arcos et al., 2017; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Thorpe et al., 2016*), M+2 (seven studies, n= 172) (*Akenhead et al., 2016; Brito et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019; Thorpe et al., 2016*), M-5 (one study, n = 29) (*Filipe Manuel Clemente, Adam Owen, et al., 2019*), M-4 (12 studies, n= 246) (*Akenhead et al., 2016; Anderson et al., 2016; Brito et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019; Kelly et al., 2019; Los Arcos et al., 2017; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019; A. L. Owen et al., 2017*), M-3 (12 studies, n= 242) (*Anderson et al., 2016; Brito et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019; Kelly et al., 2019; Los Arcos et al., 2017; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019; A. L. Owen et al., 2017; Thorpe et al., 2016*),

M-2 (13 studies, n= 275) (*Akenhead et al., 2016; Anderson et al., 2016; Brito et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019; Kelly et al., 2019; Los Arcos et al., 2017; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019; A. L. Owen et al., 2017; Thorpe et al., 2016*) and M-1 (13 studies, n= 275) (*Akenhead et al., 2016; Anderson et al., 2016; Brito et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019; Kelly et al., 2019; Los Arcos et al., 2017; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019; A. L. Owen et al., 2017; Thorpe et al., 2016*). Three studies (*Kelly et al., 2019; Martin-Garcia et al., 2018; A. L. Owen et al., 2017*) analysed position specific external and internal loads: central defender (n= 10), wide defender (n= 13), central midfielder (n= 14), wide midfielder (n= 11) and central forward (n= 18).

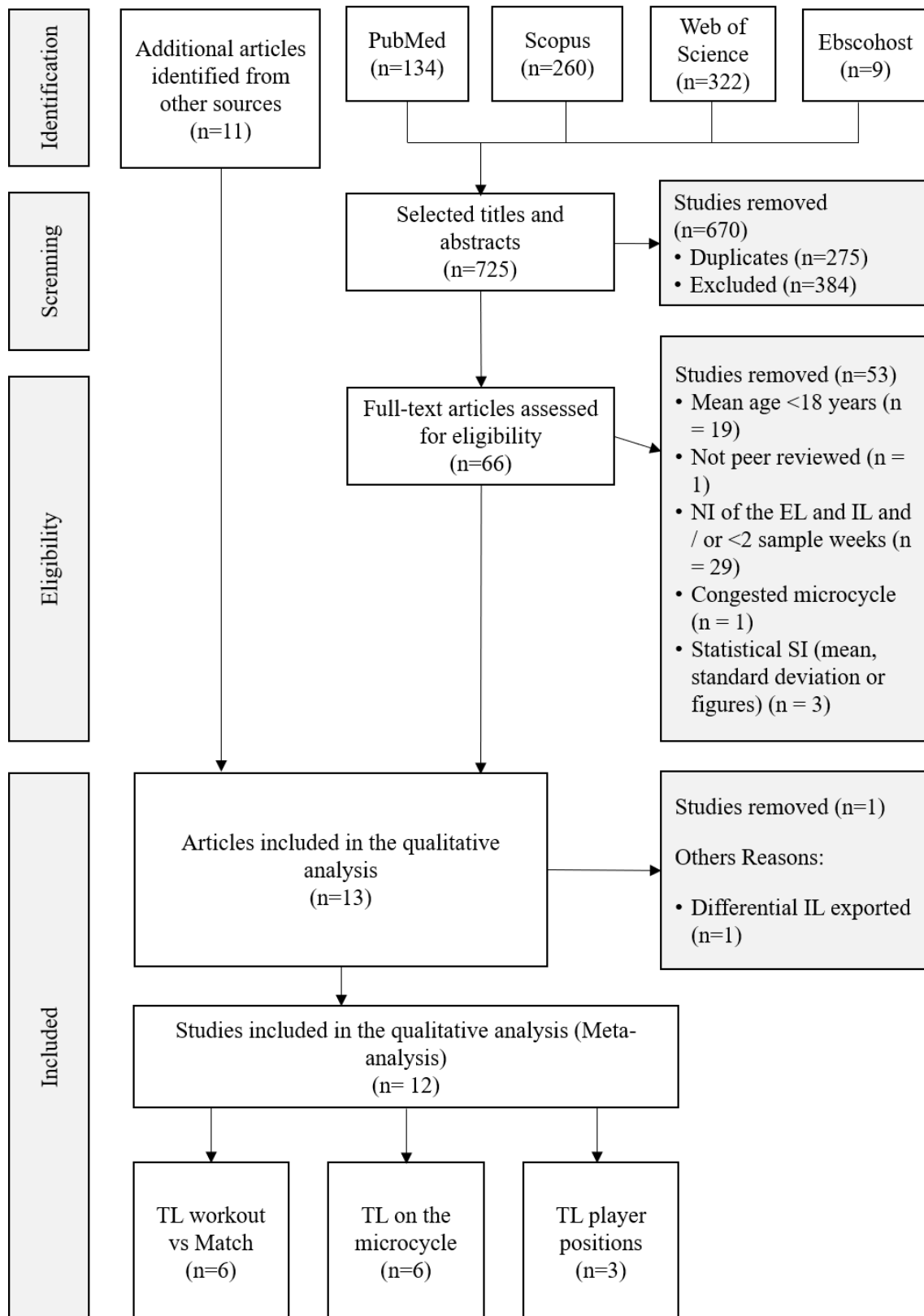


Figure 1 - Flow chart showing the study selection process.

Table 3 - Description of the studies.

Studies	Competitive Standard (Competition / Competitive Level)	Sample (N/Age/AC)	Design	Analysis system \ Instrument	External Load			Internal Load		QA
					Level I	Level II	Level III	Cardiac Indices	P	
Akenhead et al. (2016)	English Premier League; WCE	33; 24 ± 4; 82 ± 8 kg; 1,83 ± 0,05 m.	39 weeks of the competitive period; 27 weeks with a single game, 18 of which with 7-day microcycles	EL: Catapult, MiniMaxx S4, Sprint 5.1, 10 Hz; IL: Polar Team 2, Polar Electro Oy	TD (m); MIR (<10.8 km/h ⁻¹); HIR (≥20.9 km/h ⁻¹); Sprint (≥24.1 km/h ⁻¹); NE (HSR e Sprint)	low (1-2m·s ⁻²); Moderate (2-3 m·s ⁻²); High (>3 m·s ⁻²); Acc (>1 m·s ⁻² ; Dec (<-1 m·s ⁻²)	Player load (a.u.)	>90% HR _{max} (min)		0.77
Anderson et al. (2016)	English Premier League; WCE	12;25 ± 5; 81.5 ± 7.5 kg; 1.80 ± 0.05 m.	Training and game data from three different 7-day periods during the competitive period with a weekly game	EL: STATSports, Viper pod 2, Viper PSA, 10 Hz.	TD (m); VLSR (0-0.6 km/h ⁻¹); LSR (0.7-7.1 km/h ⁻¹); MSR (7.2-14.3 km/h ⁻¹); HSR (14.4–19.7 km/h ⁻¹); VHRSR (19.8–25.2 km/h ⁻¹); Sprint (>25.2 km/h ⁻¹)					0.68
Brito et al. (2016)	1 ^o French League; WCE	13; 18.6 ± 0.5; 70.0 ± 7.3 kg; 176.9 ± 4.6 cm.	36 microcycles from the competitive period; 30 weeks of training with game (2591 training sessions).	IL: sRPE (Scale: Foster 0-10)					PSE	0.73
Filipe Manuel Clemente, Adam Owen, et al. (2019)	2 ^a Portuguese and Dutch league; SE	29; 19.21 ± 1.05; 74,07 ± 6,21 kg; 180,14 ± 5,96 cm; 25.14 ± 3,90; 73,21 ± 6,46 kg; 179 ± 6,06 cm;	7 weeks of the competitive period.	EL: JOHAN Sports, JOHAN Sports Online, 10 Hz.	TD (m); LSR (0-6.9 km/h ⁻¹); MSR (7-13.9 km/h ⁻¹); HSR (14.0-20.0 km/h ⁻¹); Sprint (>20.0 km/h ⁻¹); V _{Max} (km/h); NS (m/min)		Pace (g/min); Player Load (g/min)			0.64
Grunbichler et al. (2019)	2 ^a Austrian league; SE	14; 22.6 ± 4.3; 75,7 ± 5,8 kg; 181,5 ± 5,7 cm.	Training and game load data for 13 weeks of the competitive period; 44 training sessions and 16 games.	EL /CI: Polar Team Pro System, Polar Electro Oy, 10 Hz	TD (m); ED (m); HIR (>14.4 km/h ⁻¹); VHIR (>19.8 km/h ⁻¹); Sprint (>25.2 km/h ⁻¹).	Acc: (> 2.00 m·s ⁻² -2.99 m·s ⁻²); Acc (> 3 m·s ⁻²); Dec: (< -2.00 m·s ⁻² /-2.99 m·s ⁻²); Dec (< -3 m·s ⁻²)	Polar Training Load (u.a.)	TRIMP _{MOD}		0.77
Kelly et al. (2019)	English Premier League; WCE	26; 27 ± 5.4; 77 ± 6,6 kg; 181 ± 7,0 cm.	36 weeks of the competitive period; training and game data, 6 mesocycles, each of which consists of 6 microcycles of equal duration (7 days).	EL: GPSports, SPI ProX, 5Hz IL: sRPE (Scale: Foster 0-10)	TD (m); HIR: (>14.4 km/h ⁻¹); VHRSR: (19.8–25.2 km/h ⁻¹)				PSE	0.64
Los Arcos et al. (2017)	2 ^o B Spanish; SE	24; 20.3 ± 2.0; 73.0 ± 5,6 kg; 1.79 ± 0.05 m.	10 microcycles of 8 days, 11 microcycles of 7 days, 9 microcycles of 6 days; competitive period.	IL: sRPE PE (Scale: Foster 0-10)					PSE	0.59
Martin-Garcia et al. (2018)	La liga; WCE	24; 20 ± 2; 70.2 ± 6.1 kg; 1.78 ± 0.64 m.	37 games in 42 weeks of training; 6 days between games and 5 daily training sessions.	EL: STATSports, Viper, Viper PSA, 10 Hz	TD (m); HIR (>19.8 km/h ⁻¹); Sprint (>25.2 km/h ⁻¹);	Acc (>3 m·s ⁻²); Dec (<-3 m·s ⁻²); AMP (W·kg ⁻¹); HMLD (m>25.5W·kg ⁻¹)				0.59

Oliveira, Brito, Martins, Mendes, Marinho, et al. (2019)	NI; WCE	19; 26.3 ± 4.3; 78.5 ± 6.8 kg; 183.5 ± 6.6 cm.	39 weeks of the competitive period, in which players played 50 games.	EL: STATSports, Viper pod 2, Viper PSA, 10 Hz	TD (m); HIR: (>19 km/h ⁻¹); V _{Ave} (m/min).		0.68
Oliveira, Brito, Martins, Mendes, Calvete, et al. (2019)	NI; WCE	13; 26.2 ± 4.1; 78.7 ± 5.1 kg; 183.5 ± 6.1cm.	Training and game data; 39 weeks of competitive period	EL: STATSports, Viper pod 2, Viper PSA, 10 Hz IL: sRPE (Scale: Foster 0-10)	TD (m); zone 1 (0-10.9 km/h ⁻¹); zone 2 (11-13.9 km/h ⁻¹); zone 3 (14-18.9 km/h ⁻¹); zone 4 (19-23.9 km/h ⁻¹); zone 5 (>24 km/h ⁻¹)	PSE	0.73
A. L. Owen et al. (2017)	NI; WCE	16; 26.7 ± 4.07; 78.4 ± 8.03kg; 183.4 ± 5.87cm.	6 microcycles and 24 training sessions in the competitive period.	EL: Catapult, 10Hz; IL: sRPE (Scale: Foster 0-10)	TD (m); V _{Ave} (m/min); VLSR (0-7.2 km/h ⁻¹); LSR (7.3-14.3 km/h ⁻¹); MSR (14.4-21.5 km/h ⁻¹); HSR (21.6 – 25.2 km/h ⁻¹); VHIR (>25.2 km/h ⁻¹)	PSE	0.86
Owen A et al. (2019)	NI; WCE	23; 24.4 ± 4.1; 77.8 ± 5.4 kg; 182.5 ± 2 cm.	Of the 12 training microcycles, from 7 weeks (2 games in 5 or more days).	EL: STATSports, Viper, Viper, 10 Hz	DT (m); HIR (>19.8 km/h ⁻¹); Sprint (24.4 km/h ⁻¹);	Acc (>1 m·s ⁻²); Dec (<-1 m·s ⁻²)	0.73
Thorpe et al. (2016)	English Premier League; WCE	29/27 ± 5.1/78 ± 6,1 kg; 181 ± 7,1 cm.	6-day CT, of microcycles of a weekly game (median of 3 weeks per player; range from 1 to 13) during the competitive period.	IL: sRPE (Scale: Foster 0-10)			PSE 0.86

N: Sample size; P: Percentages; WCE: World Class Elite; ES: Successful Elite; Body Mass: kg; AC: Anthropometric characteristics; Cm: centimetres; NI: No Information; Sun: Sunday; Sat: Saturday; TL: Training Load; EL: External load; IL: Internal Load; QA: qualitative assessment; Acc: Acceleration; Dec: Deceleration; NE: Number of efforts; TD: Total distance; HSR: High Intensity Running; HIR: High Intensity Running; VHSR: Very High Speed Running; VHIR: Very High Intensity Running; VLSR: Very Low Speed Running; LSR: Low Speed Running; MSR: Moderate Speed Running; AMP: Average Metabolic Power; HMLD: High Metabolic Load Distance; V_{ave}: Average velocity; V_{max}: Maximum velocity; NS: Number of Sprints; ED: Equivalent Distance; MIR: Moderate intensity Running; sRPE: Rating perceived of effort session.

Table 4 - Results of the different parameters of EL and IL according to the day of the microcycle.

Studies / Categorias	Position	Units	Training (n)	Thresholds	M+1		M+2		M-5		M-4		M-3		M-2		M-1		M		TL with Match	TL without Match
					X	SD	X	SD	X	SD	X	SD	X	SD	X	SD	X	SD	X	SD		
TD																						
Akenhead et al. (2016)	Team	meters	4				4925.0	1312.0			6234.0	1368.0			5287.0	1363.0	3493.0	1324.0			19939	
Filipe Manuel Clemente, Adam Owen, et al. (2019)	Team	meters	7		6023.1	1691.3	6277.1	1422.8	7062.7	1460.6	6077.3	1054.8	6919.5	1846.3	5701.6	1272.5	4584.5	1053.1			42646	
Grunbichler et al. (2019)	Team	meters	5		4195.9	702.9					5974.1	2847.9	7055.5	2661.6	4889.0	887.2	4193.8	687.6	8985.3	2933.1	26308	35294
Kelly et al. (2019)	CD	meters	5				3294.1	1512.6			3663.9	1882.4	3932.8	1815.1	3327.9	1579.8	2454.0	1310.9	9075.6	1378.2	16673	25748
	WD	meters	5				3495.8	1546.2			3731.1	1848.7	4033.6	1680.7	3159.7	1479.0	2554.6	1277.3	9546.2	1344.5	16975	26521
	CM	meters	5				3697.5	1142.9			4168.1	1445.4	4302.5	1310.9	3428.6	1142.9	2857.1	941.2	8369.8	1042.0	18454	26824
	WM	meters	5				3764.7	1848.7			3899.2	2487.4	4201.7	2050.4	3126.1	1815.1	2554.6	1579.8	8000.0	1647.1	17546	25546
	CF	meters	5				4235.4	1142.9			4235.2	1613.4	4369.9	1310.9	3865.6	1109.2	3294.1	941.2	8067.2	1042.0	20000	28067
Martin-Garcia et al. (2018)	Team	meters	5		3826.5	1068.9					5123.2	904.5	5602.8	1205.7	4220.6	620.2	2675.3	601.7			21448	
	CD		5		3574.4	1154.4					4769.6	565.7	5463.4	1297.0	4084.8	569.1	2725.4	512.3			20618	
	WD		5		4248.6	971.8					5472.4	1089.7	5726.3	1451.7	4327.9	664.3	2667.6	694.6			22443	
	CM		5		3900.8	868.9					5510.7	1149.1	5828.5	1060.6	4207.0	399.6	2842.8	376.2			22290	
	WM		5		3143.6	1054.8					4874.1	854.2	5407.6	854.0	3838.9	403.5	2396.8	687.5			19661	
	CF		5		4227.6	971.4					5149.2	803.5	5632.5	1162.6	4423.4	680.5	2737.3	580.7			22170	
Oliveira, Brito, Martins, Mendes, Marinho, et al. (2019)	Team	meters	6		4576.7	184.8	7482.0	173.1			5943.9	105.4	6205.6	106.4	5404.7	59.2	3564.7	55.6			33178	
Oliveira, Brito, Martins, Mendes, Calvete, et al. (2019)	Team	meters	4								7036.8	240.6	6209.4	642.6	5358.8	454.0	2757.1	208.2	9876.9	2291.4	21362	31239
A. L. Owen et al. (2017)	CD	meters	4								5967.3	419.3	6046.2	478.4	5317.4	737.5	2827.1	526.6			20158	
	WD	meters	4								5592.6	846.6	6716.8	1761.2	6064.3	731.2	3233.7	961.3			21607	
	CM	meters	4								5867.0	1036.6	7284.4	2168.9	5955.9	862.6	3742.6	1124.3			22850	
	WM	meters	4								6015.9	1000.8	7490.4	1715.1	5909.7	635.9	3867.8	1326.8			23284	
	CF	meters	4								5754.3	771.0	5681.9	916.8	5529.9	646.6	3016.3	862.6			19982	
Owen A et al. (2019)	Team	meters/min	5				79.0	8.5			79.5	16.4	89.0	10.3	68.2	11.1	41.0	9.5			357	
Average Team *					4656	912	6228	969	7063	1461	6065	1087	6399	1293	5144	776	3545	655	9431	2612	27480	33266

HSR

Anderson et al. (2016)	Team	meters	4	14.4-19.7 km/h ⁻¹							176.0	37.0	473.0	129.0	130.0	58.0	101.0	46.0	1559.0	357.0	880	2439
Filipe Manuel Clemente, Adam Owen, et al. (2019)	Team	meters	7	14-18.9 km/h ⁻¹	513.6	228.8	573.1	371.5	990.4	359.7	523.3	181.7	623.1	268.9	532.2	279.5	342.9	172.2			4099	
Oliveira, Brito, Martins, Mendes, Calvete, et al. (2019)	Team	meters	4	14–0 - 20.0 km/h ⁻¹							786.1	83.1	684.9	182.0	606.4	127.7	114.5	44.0	1380.0	563.9	2192	3572
Average Team					514	229	573	371	990	360	495	101	594	193	423	155	186	87	1470	460	2390	3005
VHSR																						
Anderson et al. (2016)	Team	meters	4	19.8-25.1 km/h ⁻¹							18.0	13.0	96.0	57.0	26.0	28.0	16.0	11.0	706.0	246.0	156	862
Kelly et al. (2019)	CD	meters	5	19.8–25.2 km/h ⁻¹			122.0	144.7			127.7	173.1	153.2	164.5	130.5	136.2	87.9	113.5	505.0	119.2	621	1126
	WD	meters	5				127.7	139.0			110.6	167.4	167.4	153.2	116.3	127.7	93.6	110.6	666.7	116.3	616	1282
	CM	meters	5				94.3	105.0			141.8	130.5	161.7	119.2	99.3	102.1	73.8	85.1	629.8	87.9	571	1201
	WM	meters	5				164.5	164.6			153.2	221.3	207.1	184.4	153.2	158.9	90.8	139.0	641.1	144.7	769	1410
	CF	meters	5				139.0	105.0			158.9	144.7	136.2	122.0	153.2	95.5	105.0	82.3	627.0	93.6	692	1319
Oliveira, Brito, Martins, Mendes, Marinho, et al. (2019)	Team	meters	4	19-23.9 km/h ⁻¹							265.7	40.9	195.0	68.8	200.2	55.1	24.3	12.8	554.6	225.4	685	1240
A. L. Owen et al. (2017)	CD	meters	4	21.6-25.2 km/h ⁻¹							84.3	122.7	95.0	46.8	71.1	84.1	2.3	5.1			253	
	WD	meters	4								71.2	60.2	109.0	78.2	90.9	70.6	22.9	53.0			294	
	CM	meters	4								61.6	49.4	123.1	105.0	70.5	55.3	26.0	77.9			281	
	WM	meters	4								67.1	63.0	148.2	94.7	96.3	65.6	35.3	76.7			347	
	CF	meters	4								91.3	80.5	95.5	44.6	44.0	34.7	6.9	11.2			238	
Average Team											142	27	146	63	113	42	20	12	630	236	421	1051
Sprint																						
Akenhead et al. (2016)	Team	meters	4	≥24.1 km/h ⁻¹			7.0	50.0			46.0	51.0			28.0	51.0	6.0	50.0			87	
Anderson et al. (2016)	Team	meters	3	>25.1 km/h ⁻¹									6.0	8.0	0.0	1.0	2.0	3.0	290.0	118.0	8	298
Grunbichler et al. (2019)	Team	meters	5	>25.2 km/h ⁻¹	17.1	37.0					55.5	78.8	76.8	85.2	32.8	52.1	10.6	21.2	113.2	92.3	193	306
Martin-Garcia et al. (2018)	Team	meters	5	>25.2 km/h ⁻¹	20.5	36.5					55.9	59.6	34.2	37.9	12.1	27.9	8.1	18.4			131	
	CD		5		14.8	24.2					53.4	52.5	25.5	34.2	11.3	36.2	6.3	15.6			111	
	WD		5		37.3	51.1					104.6	61.8	55.9	46.1	23.7	37.9	13.4	21.5			235	
	CM		5		17.6	31.5					10.3	10.1	17.1	21.5	6.7	11.7	0	0			52	
	WM		5		9.6	19.6					27.5	33.2	17.7	21.1	4.4	9.2	7.7	21.3			67	
	CF		5		4.2	9.4					38.3	56.9	40.7	35.4	6.7	8.8	5.9	14.7			96	

Oliveira, Brito, Martins, Mendes, Calvete, et al. (2019) A. L. Owen et al. (2017)	Team	meters	4	>24 km/h ⁻¹						95.5	33.1	59.9	17.9	38.3	19.4	1.9	2.3	193.2	100.6	196	389	
	CD	meters	4	>25.2 km/h ⁻¹						3.3	5.8	1.0	2.2	3.4	6.2	0.9	2.8			9		
	WD	meters	4							16.0	13.7	49.2	92.2	25.1	23.1	1.4	4.1			92		
	CM	meters	4							14.6	19.3	43.2	77.4	12.3	21.3	2.9	7.1			73		
	WM	meters	4							13.7	21.0	63.6	112.6	27.7	37.4	1.2	2.8			106		
	CF	meters	4							8.6	13.6	43.7	89.0	10.4	14.3	0.0	0.0			63		
Average Team					19	37	7	50		50	56	44	37	22	30	6	19	199	104	123	331	
HIR																						
Grunbichler et al. (2019)	Team	meters	5	>14.4 km/h ⁻¹	365.5	201.1				915.4	853.5	1262.4	795.9	543.2	281.4	350.9	191.5	1911.3	727.4	3437	5349	
Kelly et al. (2019)	CD	meters	5	>14.4 km/h ⁻¹			578.3	538.4		448.6	687.9	528.4	648.0	468.5	528.4	358.9	428.7	1904.1	468.5	2383	4287	
	WD	meters	5				468.5	538.3		438.6	677.9	538.3	618.1	398.8	518.4	329.0	438.6	2282.9	468.5	2173	4456	
	CM	meters	5				498.4	408.7		568.2	518.4	608.1	468.5	458.6	398.8	368.9	329.0	2272.9	358.9	2502	4775	
	WM	meters	5				428.7	648.0		378.8	887.2	629.0	737.7	329.0	618.1	199.4	528.4	2123.4	568.2	1965	4088	
	CF	meters	5				498.4	418.7		548.3	588.2	468.5	488.5	488.5	388.8	338.9	319.0	2013.7	368.9	2343	4356	
Average Team					366	201	494	510		550	702	672	626	448	456	324	373	2085	493	2854	4939	
VHIR																						
Akenhead et al. (2016)	Team	meters	4	≥20.9 km/h ⁻¹			44.0	160.0		190.0	165.0			141.0	165.0	23.0	162.0			398		
Filipe Manuel Clemente, Adam Owen, et al. (2019)	Team	meters	7	>20.0 km/h ⁻¹	155.6	83.7	137.7	118.1	390.8	259.5	176.9	82.1	247.3	239.6	246.3	200.3	143.0	177.2		1498		
Grunbichler et al. (2019)	Team	meters	5	>19.8 km/h ⁻¹	108.2	108.8					274.8	299.3	387.7	304.6	177.2	146.8	81.6	78.3	581.9	299.8	1030	1611
Martin-Garcia et al. (2018)	Team	meters	5	>19.8 km/h ⁻¹	125.0	123.3					245.6	148.6	217.7	118.5	87.3	73.9	49.9	56.9		726		
	CD		5		136.7	112.9					216.5	119.7	154.5	106.1	57.8	59.5	43.4	45.7		609		
	WD		5		191.8	141					371.2	153.2	278.4	125.3	133.7	91.8	64.6	70.6		1040		
	CM		5		84.83	107.4					170.9	75.9	145.8	71.2	51.5	51.8	25.1	27.4		478		
	WM		5		102.7	84.4					189.9	102.8	198.1	100.1	81.1	58.3	49.7	59.7		622		
	CF		5		30.2	40					177.4	130.7	263.5	102.9	68.4	43.4	45.9	47.6		585		
Oliveira, Brito, Martins, Mendes, Marinho, et al. (2019)	Team	meters	6	>19 km/h ⁻¹	117.8	17.8	274.8	26.0			249.3	16.3	219.7	13.7	190.4	11.1	72.4	5.7		1124		
Owen A et al. (2019)	Team	meters/min	6	>19.8 km/h ⁻¹			0.1	0.3			0.8	0.8	0.7	0.7	0.6	0.7	0.2	0.3		2		
Average Team *					127	83	152	101	391	259	227	142	268	169	168	119	74	96	582	300	955	1611
AccTotal																						

Akenhead et al. (2016)	Team	meters	4	>1 m.s ⁻²			473.0	134.0			574.0	138.0			469.0	138.0	310.0	134.0		1826		
Owen A et al. (2019)	Team	n	5	>1 m.s ⁻²			25.3	10.1			46.3	15.4	38.8	15.9	27.0	13.2	37.7	11.2		175		
Average Team																						
Acc ^{High}																						
Grunbichler et al. (2019)	Team	n	5	>3.0 m/s ⁻²	5.3	3.6				9.0	7.9	10.2	7.6	7.7	5.8	6.2	7.8	11.7	9.2	38	50	
Martin-Garcia et al. (2018)	Team	n	5	>3.0 m/s ⁻²	65.9	46.0				128.1	36.5	118.7	43.5	104.2	37.3	58.9	22.4			476		
	CD		5		53.5	40.4				122.2	31.1	115.4	36.4	96.2	22.7	60.4	15.4			448		
	WD		5		88.9	47.5				135.3	40.5	129.3	51.2	123.6	46	67.3	23.5			544		
	CM		5		54.6	35.1				148.6	45.2	127.1	38.2	106.6	38	68.4	18.8			505		
	WM		5		84	46.1				127	28.5	119.2	44.2	100.8	33.3	54.7	24.1			486		
	CF		5		38.2	39.8				111.5	36.8	96.9	33.9	81.7	23	41.9	18.1			370		
Average Team																						
Dec ^{Total}																						
Akenhead et al. (2016)	Team	n	4	< -1 m.s ⁻²			417.0	92.0			501.0	87.0			411.0	78.0	269.0	72.0		1598		
Dec ^{High}																						
Grunbichler et al. (2019)	Team	n	6	< -3.0 m/s ⁻²	4.6	3.6				11.4	9.8	15.2	9.9	7.8	6.1	5.2	3.6	20.9	10.5	44	65	
Martin-Garcia et al. (2018)	Team	n	5	< -3.0 m/s ⁻²	60.8	44.0				115.4	32.8	108.0	40.9	98.8	36.5	56.9	20.9			440		
	CD		5		42.5	31.1				104.4	24.3	97.8	35.1	84.7	23.4	56.6	13.8			386		
	WD		5		85.9	45.6				125.8	35.5	123.3	46.2	119.3	41.8	65.2	22.2			520		
	CM		5		58.6	37.5				131.6	45.5	108.2	28.1	103.2	41.9	66.3	18.3			468		
	WM		5		66.8	42.9				116	28.3	107.9	58.9	95.9	33.3	52.6	21.8			439		
	CF		5		36.2	41.5				100.3	27.5	92.9	27.7	80.3	25.5	42.7	18.5			352		
Average Team																						
PL																						
Akenhead et al. (2016)	Team	a.u.	4				536.0	161.0			622.0	128.0			543.0	167.0	392.0	162.0		2093		
Filipe Manuel Clemente, Adam Owen, et al. (2019)	Team	g/min	7		4.4	0.8	4.2	0.8	5.1	1.1	4.3	1.2	4.2	0.7	3.7	0.8	3.5	1.0		29		
Grunbichler et al. (2019)	Team	a.u.	5		82.4	32.4					157.0	95.5	187.6	90.3	101.6	37.0	84.3	33.9	262.2	90.4	613	875
Average Team																						
sRPE																						
Brito et al. (2016)	Team	a.u.	5				492.8	229.6			666.4	229.6	459.2	218.5	257.6	112.0	257.6	162.4	733.6	106.4	2134	2867

Kelly et al. (2019)	CD	a.u.	5				248.1	139.0		271.6	179.6	318.7	164.7	241.7	139.0	139.0	117.6	624.5	124.0	1219	1843
	WD		5				273.7	141.1		271.6	169.0	359.3	154.0	243.8	130.5	151.8	151.8	635.2	126.2	1300	1935
	CM		5				260.9	109.1		297.3	130.5	333.6	117.6	205.3	104.8	169.0	87.7	491.9	96.2	1266	1758
	WM		5				218.1	169.0		216.0	224.6	245.9	188.2	158.3	162.5	121.9	139.0	481.2	149.7	960	1441
	CF		5				329.3	100.5		295.1	141.1	335.8	115.5	278.0	98.4	213.9	81.3	517.5	96.2	1452	1970
Oliveira, Brito, Martins, Mendes, Calvete, et al. (2019)	Team	a.u.	4							199.3	129.9	326.9	77.2	366.5	98.4	176.7	63.3			1069	
A. L. Owen et al. (2017)	CD	a.u.	4							522.0	44.1	721.0	64.5	337.5	67.5	220.4	42.8			1801	
	WD		4							493.5	75.7	656.6	105.1	356.9	79.1	222.7	52.5			1730	
	CM		4							504.3	58.3	758.6	79.5	342.8	59.1	174.7	39.9			1780	
	WM		4							532.7	63.0	784.2	80.7	389.4	70.1	195.7	38.1			1902	
	CF		4							570.5	35.5	764.6	55.8	364.6	49.5	203.1	43.3			1903	
Thorpe et al. (2016)	Team	a.u.	5	44.0	79.0	224.0	166.0					301.0	101.0	239.0	84.0	183.0	75.0	605.0	56.0	991	1596
Average Team				44	79	358	198			433	180	362	132	288	98	206	100	669	81	1398	2232
TRIMP _{MOD}																					
Grunbichler et al. (2019)	Team	a.u.	5	54.6	30.3					124.5	95.7	159.1	91.7	69.4	33.7	54.9	29.5	240.2	86.8	463	703
>90% HR _{max}																					
Akenhead et al. (2016)	Team	min	4			7.0	7.0			7.0	8.0			4.0	5.0	3.0	5.0			21	

n: Number; X: Mean; SD: Standard Deviation; min: Minutes;J - x = x days before the game; TL: Training Load; TD: Total distance; HSR: High Intensity Running; VHRS: Very High Speed Running; HIR: High Intensity Running; VHIR: Very High Intensity Running; Acc: Acceleration; Dec: Deceleration; PL: Player Load; sRPE: Rating perceived of effort session; HR_{max}: Maximum heart rate; a.u.: Arbitrary Units; CD: Central Defender; WD: Wide Defender; CM: Central Midfielder; WM: Wide Midfielder; CF: Central Forward; *: Values shown exclude m / min.

3.2. Analysis of the load of training sessions vs. game

Regarding the training variables, number and duration of the training sessions, the microcycles that contained 4 training sessions (total volume of 273min) (Akenhead et al., 2016; Anderson et al., 2016; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019) were 126 and 108 minutes lower than to the competitive microcycles that involved the completion of 5 (399min) (Grunbichler et al., 2019; Martin-Garcia et al., 2018) and 6 training sessions, respectively (381min) (Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019). Within the microcycle, the duration of the game represented 18% of the total weekly training volume, that is, the weekly training volume was almost 5 times greater (463%) than the game volume. The duration of recovery training was, on average 56 min on M+1 (range: 20min to 80min) (Grunbichler et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019) and 78 min on M+2 (range: 76min to 80min) (Akenhead et al., 2016; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019). Regarding the duration of the acquisition training, M-4 had on average a duration of 71 min (range: 34min to 91min) (Akenhead et al., 2016; Anderson et al., 2016; Grunbichler et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019), M-3 of 74 min (range: 62min a 91mim) (Anderson et al., 2016; Grunbichler et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019), M-2 of 77 min (range: 60min to 87min) (Akenhead et al., 2016; Anderson et al., 2016; Grunbichler et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019), and M-1 of 68 min (range: 60min to 86min) (Akenhead et al., 2016; Anderson et al., 2016; Grunbichler et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019). Regarding time-motion external load metrics the TD (Grunbichler et al., 2019; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019) in the game represented 31% of the overall TD performed in the microcycle. In turn, the TD performed only in the training sessions more than doubled (223%, range: 26541m to 35294m) that the one performed during the game. Regarding the distances covered in the different

high intensity categories / intervals, the HIR (*Grunbichler et al., 2019; Kelly et al., 2019*), VHSR (*Anderson et al., 2016; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019*) and sprint distance (*Anderson et al., 2016; Grunbichler et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019*) performed during the game represented 46% (range: 4393m to 5349m), 53% (range: 862m to 1268m) and 61% (range: 298m to 389m) of the overall weekly load, respectively. Regarding the internal load metrics, the sRPE (*Brito et al., 2016; Kelly et al., 2019; Thorpe et al., 2016*) recorded during the game represented 31% of the overall weekly load.

3.3 Comparative analysis between training sessions vs. Game: group analysis.

Table 5 shows the data obtained from the meta-analysis (e.g. Hedges' g , CI, I^2 and number of players by parameter) of the external and internal load performed between training and games. We examined substantial differences between all the training days and the game independently of the metrics analysed. However, only one study investigated the VHIR, Acceleration_{High}, deceleration_{High}, player load and TRIMP both in training and game. In the remaining metrics, the number of studies increased considerably (ranging from two to six).

Match vs. M+1:

Moderate effects were observed in sprint distance ($\Delta = 15\%$) (*Grunbichler et al., 2019*) and acceleration_{High} (45%) (*Grunbichler et al., 2019*). There was a large effect for TD (47%) (*Grunbichler et al., 2019*) and VHIR (19%) (*Grunbichler et al., 2019*) and very large for HIR (19%) (*Grunbichler et al., 2019*), deceleration_{High} (22%) (*Grunbichler et al., 2019*) and PL ($\Delta = 31\%$) (*Grunbichler et al., 2019*). There was a very large effect for sRPE and TRIMP (7% (*Grunbichler et al., 2019*) and 23% (*Grunbichler et al., 2019*), respectively).

Match vs. M+2:

Very large effects were found for TD (45%, range: 36% to 53%) (*Kelly et al., 2019*), VHSR (20%, range: 15% to 26%) (*Kelly et al., 2019*) and HIR (24%, range: 20% to 30%) (*Kelly et al., 2019*).

Match vs. M-4:

There was a moderate effect for sprint distance (%adj = 49%, range: 49%) (*Grunbichler et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019*), large for TD (%adj = 58%, range: 39% to 71%) (*Grunbichler et al., 2019; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019*) and HIR (%adj = 32%, range: 18% to 48%) (*Grunbichler et al., 2019; Kelly et al., 2019*) and very large for VHRS (%adj = 25%, range: 3% to 48%) (*Anderson et al., 2016; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019*). The effect was moderate for sRPE (%adj = 65%, range: 43% to 91%) (*Brito et al., 2016; Kelly et al., 2019*).

Match vs. M-3:

Large effects were observed for TD (%adj = 61%, range: 42% to 79%) (*Grunbichler et al., 2019; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019*), sprint distance (%adj = 35%, range: 2% to 68%) (*Anderson et al., 2016; Grunbichler et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019*) and HIR (%adj = 40%, range: 23% to 66%) (*Grunbichler et al., 2019; Kelly et al., 2019*). There was a very large change for HSR (%adj = 40%, range: 30% to 50%) (*Anderson et al., 2016; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019*) and VHRS (%adj = 25%, range: 14% to 35%) (*Anderson et al., 2016; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019*). The effect was large for sRPE (%adj = 56%, range: 50% to 68%) (*Brito et al., 2016; Kelly et al., 2019; Thorpe et al., 2016*).

Match vs. M-2:

There were large differences on the sprint distance (%adj = 25%, range: 20% to 29%) (*Grunbichler et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019*) and very large on the TD (%adj = 48%, range: 54% to 33%) (*Grunbichler et al., 2019; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019*), HSR (%adj = 27%, range: 8% to 44%) (*Anderson et al., 2016; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019*), VHRS (%adj = 21%, range: 4% to 36%) (*Anderson et al., 2016; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019*) and HIR (%adj = 24%, range: 15% to 28%) (*Grunbichler et al., 2019; Kelly et al., 2019*). The effect was large for sRPE

(%adj = 40%, range: 33% to 54%) (Brito et al., 2016; Kelly et al., 2019; Thorpe et al., 2016).

Match vs. M-1:

Large effects were observed in the sprint distance (%adj = 4%, range: 1% to 9%) (Anderson et al., 2016; Grunbichler et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019) and very large in the TD (%adj = 36%, range: 27% to 47%) (Grunbichler et al., 2019; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019), HSR (%adj = 7%, range: 6% to 8%) (Anderson et al., 2016; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019), VHSR (%adj = 9%, range: 2% to 17%) (Anderson et al., 2016; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019) and HIR (%adj = 17%, range: 9% to 19%) (Grunbichler et al., 2019; Kelly et al., 2019). The magnitude of the effect was classified as large for sRPE (%adj = 32%, range: 22% to 41%) (Brito et al., 2016; Kelly et al., 2019; Thorpe et al., 2016).

3.4 Comparative analysis between training sessions: group analysis

Table 6 shows the summary of findings from meta-analysis describing the training load during the recovery days vs. acquisition days.

3.4.1 Analysis of team performance

Regarding recovery training days (M+1 and M+2), there was a small effect for sprint distance, moderate for sRPE and very large for TD and VHIR between these two training moments. The meta-analysis between the recovery vs. acquisition training days revealed trivial to large changes, however only the metrics TD (Akenhead et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019), VHIR (Akenhead et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019), and sRPE (Brito et al., 2016; Kelly et al., 2019; Thorpe et al., 2016) showed more than one study at different times (M-4 vs. M+2, M-3 vs. M+2 and M-2 vs. M+2). The same was observed for acceleration_{Total} (Akenhead et al., 2016; Owen A et al., 2019) and Player load (Akenhead et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019) when comparing M-4 vs. M+2 e M-

2 vs. M+2. The comparison between acquisition days (M-4 vs. M-3, M-4 vs. M-2 and M-3 vs. M-2) and acquisition days vs pre-game day (M-4 vs. M-1, M-3 vs. M-1 e M-2 vs. M-1) were the time-points more extensively investigated in the literature independently of the type of metric examined. On the other hand, there was only one study examining acceleration_{Total} (Owen A et al., 2019) between M-3 vs. M-2 and M-4 vs. M-3 . There were no studies investigating deceleration_{Total} (Akenhead et al., 2016) between M-3 vs. M-2 and M-4 vs. M-3 with just one study allowing to compare M-4 vs. M-2 (Table 7).

3.4.1.1 Recovery Training

M+2 vs. M+1

Only one study allowed to compare M+1 with M+2, with a large effect being computed for sRPE ($\Delta = 19\%$) (Thorpe et al., 2016).

3.4.1.2 Recovery Training days vs. Acquisition Training days

M+2 vs. M-5

Only one study (Filipe Manuel Clemente, Adam Owen, et al., 2019) analysed the differences in external loads between these two training moments (Table 6). There was a small effect for the TD ($\Delta = 13\%$), and moderate for the HSR ($\Delta = 73\%$), VHIR ($\Delta = 184\%$) and player load ($\Delta = 22\%$).

M+2 vs. M-4

Moderate increments were observed for the sprint distance ($\Delta = 557\%$) (Akenhead et al., 2016), acceleration_{Total} (Akenhead et al., 2016; Owen A et al., 2019) ($\Delta = 52\%$, range: 21% to 83%) and deceleration_{Total} ($\Delta = 20\%$) (Akenhead et al., 2016).

M+2 vs. M-3

Moderate and small increments were examined for acceleration_{Total} ($\Delta = 53\%$) (Akenhead et al., 2016) and sRPE ($\Delta = 19\%$, range: -7% to 34%), respectively (Brito et al., 2016; Kelly et al., 2019; Thorpe et al., 2016).

M+2 vs. M-2

There was a small increment in sRPE ($\Delta = -17\%$, range: -48% to 7%) (Brito *et al.*, 2016; Kelly *et al.*, 2019; Thorpe *et al.*, 2016) and moderate in the sprint distance ($\Delta = 300\%$) (Akenhead *et al.*, 2016). However, the latter effect was computed from a single study.

3.4.1.3 Acquisition Training

M-3 vs. M-2

There were observed small effects for VHSR ($\Delta = -27\%$, range: -73% to 12%) (Anderson *et al.*, 2016; Kelly *et al.*, 2019; Oliveira, Brito, Martins, Mendes, Calvete, *et al.*, 2019; A. L. Owen *et al.*, 2017), sprint distance ($\Delta = -44\%$, range: -76% to 244%) (Grunbichler *et al.*, 2019; Martin-Garcia *et al.*, 2018; Oliveira, Brito, Martins, Mendes, Calvete, *et al.*, 2019; A. L. Owen *et al.*, 2017), HIR ($\Delta = -31\%$, range: -57% to 4%) (Grunbichler *et al.*, 2019; Kelly *et al.*, 2019) and acceleration_{High} ($\Delta = -17\%$, range: -25% to -12%) (Grunbichler *et al.*, 2019; Martin-Garcia *et al.*, 2018). A moderate effect was examined for TD ($\Delta = -19\%$, range: -31% to -3%) (Filipe Manuel Clemente, Adam Owen, *et al.*, 2019; Grunbichler *et al.*, 2019; Kelly *et al.*, 2019; Martin-Garcia *et al.*, 2018; Oliveira, Brito, Martins, Mendes, Calvete, *et al.*, 2019; Oliveira, Brito, Martins, Mendes, Marinho, *et al.*, 2019; Owen A *et al.*, 2019; A. L. Owen *et al.*, 2017), HSR ($\Delta = -27\%$, range: -73% a -11%) (Anderson *et al.*, 2016; Filipe Manuel Clemente, Adam Owen, *et al.*, 2019; Oliveira, Brito, Martins, Mendes, Calvete, *et al.*, 2019), VHIR ($\Delta = -25\%$, range: -60% to 0%) (Filipe Manuel Clemente, Adam Owen, *et al.*, 2019; Grunbichler *et al.*, 2019; Martin-Garcia *et al.*, 2018; Oliveira, Brito, Martins, Mendes, Marinho, *et al.*, 2019; Owen A *et al.*, 2019), acceleration_{Total} ($\Delta = -30\%$) (Owen A *et al.*, 2019) and player load ($\Delta = -23\%$, range: -46% to -12%) (Filipe Manuel Clemente, Adam Owen, *et al.*, 2019; Grunbichler *et al.*, 2019). The magnitude of the effect was classified as moderate for sRPE ($\Delta = -27\%$, range: -55% to 12%) (Brito *et al.*, 2016; Kelly *et al.*, 2019; Oliveira, Brito, Martins, Mendes, Calvete, *et al.*, 2019; A. L. Owen *et al.*, 2017; Thorpe *et al.*, 2016).

M-4 vs. M-2

Small decrements in TD ($\Delta = -13\%$, range: -24% to 8%) (Akenhead *et al.*, 2016; Filipe Manuel Clemente, Adam Owen, *et al.*, 2019; Grunbichler *et al.*, 2019; Kelly *et al.*, 2019; Martin-Garcia *et al.*, 2018; Oliveira, Brito, Martins, Mendes,

Calvete, et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019; A. L. Owen et al., 2017), acceleration_{High} ($\Delta = -17\%$, range: -19% to -14%) (Grunbichler et al., 2019; Martin-Garcia et al., 2018), and deceleration_{High} ($\Delta = -21\%$, range: -32% to -14%) (Grunbichler et al., 2019; Martin-Garcia et al., 2018) and player load ($\Delta = -17\%$, range: -35% to -13%) (Akenhead et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019) were observed. There was a moderate decrement in VHIR ($\Delta = -20\%$, range: -64% to 39%) (Akenhead et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019), acceleration_{Total} ($\Delta = -28\%$, range: -42% to -18%) (Akenhead et al., 2016; Owen A et al., 2019) and deceleration_{Total} ($\Delta = -21\%$) (Akenhead et al., 2016). The effect was moderate for sRPE ($\Delta = -7\%$, range: -61% to 84%) (Brito et al., 2016; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; A. L. Owen et al., 2017).

M-4 vs. M-3

There was a moderate change for sRPE ($\Delta = 16\%$, range: -31% to 64%) (Brito et al., 2016; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; A. L. Owen et al., 2017) and acceleration_{Total} ($\Delta = -16\%$) (Owen A et al., 2019). However, the value observed in the latter parameter resulted from a single study.

3.4.1.4 Acquisition Training vs. Pre-Game

M-5 vs. M-1

Only one study (Filipe Manuel Clemente, Adam Owen, et al., 2019) reported differences in external load for these two days of the microcycle (Table 8). The magnitude of the effect was moderate for the VHIR ($\Delta = -63\%$), large for the TD ($\Delta = -35\%$) and for the player load ($\Delta = -31\%$) and very large for the HSR ($\Delta = -65\%$).

M-4 vs M-1

Small decrements were observed for VHSR ($\Delta = -50\%$, range: -97% to 11%) (Anderson et al., 2016; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes,

Calvete, et al., 2019; A. L. Owen et al., 2017) and HIR ($\Delta = -43\%$, range: -62% to -20%) (Grunbichler et al., 2019; Kelly et al., 2019). There as a moderate decrement in sprint distance ($\Delta = -87\%$, range: -98% to -73%) (Akenhead et al., 2016; Grunbichler et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; A. L. Owen et al., 2017), VHIR ($\Delta = -68\%$, range: -88% to -19%) (Akenhead et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019), deceleration_{Total} ($\Delta = -46\%$) (Akenhead et al., 2016) and player load ($\Delta = -32\%$, range: -46% to -19%) (Akenhead et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019). Large decrements were examined for TD ($\Delta = -40\%$, range: -61% to -22%) (Akenhead et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019; Kelly et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019; A. L. Owen et al., 2017) and deceleration_{High} ($\Delta = -52\%$, range: -54% to -51%) (Grunbichler et al., 2019; Martin-Garcia et al., 2018). There was a very large effect for HSR ($\Delta = -49\%$, range: -85% to -34%) (Anderson et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019). A Moderate reduction was observed for sRPE ($\Delta = -30\%$, range: -65% to -11%) (Brito et al., 2016; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; A. L. Owen et al., 2017).

M-3 vs. M-1

A small decrement was observed for HIR ($\Delta = -50\%$, range: -72% to -28%) (Grunbichler et al., 2019; Kelly et al., 2019) and moderate for VHSR ($\Delta = -68\%$, range: -98% to -23%) (Anderson et al., 2016; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; A. L. Owen et al., 2017), sprint distance ($\Delta = -80\%$, range: -98% to -10%) (Grunbichler et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; A. L. Owen et al., 2017) and player load ($\Delta = -29\%$, range: -55% to -16%) (Akenhead et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019). There was a large reduction in TD ($\Delta = -44\%$, range: -56% to -25%) (Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019; Kelly et al., 2019;

Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019; A. L. Owen et al., 2017), VHIR ($\Delta = -66\%$, range: -79% to -42%) (*Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019*) and deceleration_{High} ($\Delta = -54\%$, range: -66% to -47%) (*Grunbichler et al., 2019; Martin-Garcia et al., 2018*) and very large in HSR ($\Delta = -62\%$, range: -83% to -45%) (*Anderson et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019*). The effect was large for sRPE ($\Delta = -49\%$, range: -77% to -36%) (*Brito et al., 2016; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; A. L. Owen et al., 2017; Thorpe et al., 2016*).

M-2 vs. M-1

There was a small decrement in VHSR ($\Delta = -53\%$, range: -97% to -20%) (*Anderson et al., 2016; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; A. L. Owen et al., 2017*), sprint distance ($\Delta = -69\%$, range: -95% to -33%) (*Akenhead et al., 2016; Grunbichler et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; A. L. Owen et al., 2017*), HIR ($\Delta = -29\%$, range: -39% to -17%) (*Grunbichler et al., 2019; Kelly et al., 2019*) and player load ($\Delta = -17\%$, range: -28% to -5%) (*Akenhead et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019*). The reductions in VHIR ($\Delta = -61\%$, range: -84% to -42%) (*Akenhead et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019*) and deceleration_{High} ($\Delta = -39\%$, range: -42% to -33%) (*Grunbichler et al., 2019; Martin-Garcia et al., 2018*) were considered moderate. A large effect was observed for TD ($\Delta = -31\%$, range: -49% to -14%) (*Akenhead et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019; Kelly et al., 2019; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019; A. L. Owen et al., 2017*), HSR ($\Delta = -44\%$, range: -81% to -22%) (*Anderson et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019*) and deceleration_{Total}

($\Delta = -35\%$) (Akenhead et al., 2016). The effect was moderate for sRPE ($\Delta = -28\%$, range: -52% to 0%) (Brito et al., 2016; Kelly et al., 2019; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; A. L. Owen et al., 2017; Thorpe et al., 2016).

3.5 Comparative analysis between training sessions: individual positional analysis

The summary of findings from the meta-analysis describing the training load by field position can be examined in tables 9-14. Regarding the analysis by individual field position, it was possible to meta-analyse the TD (Kelly et al., 2019; Martin-Garcia et al., 2018; A. L. Owen et al., 2017), VHSR (Kelly et al., 2019; A. L. Owen et al., 2017), sprint distance (Martin-Garcia et al., 2018; A. L. Owen et al., 2017) and sRPE (Kelly et al., 2019; A. L. Owen et al., 2017) metrics, on the following categories of comparison: i) Acquisition training days; and ii) Acquisition training days vs. pre-game day. Small to moderate effects on TD were observed between M-3 and M-2. On the contrary, no substantial differences were observed between M-4 and M-2 and M-4 and M-3, regardless of the field position.

3.5.1 Acquisition training:

M-3 vs. M-2

There was a moderate change for TD for the CD ($\Delta = -17\%$, range: -18% to -9%) (Kelly et al., 2019; Martin-Garcia et al., 2018; A. L. Owen et al., 2017), WD ($\Delta = -19\%$, range: -18% to 8%) (Kelly et al., 2019; Martin-Garcia et al., 2018; A. L. Owen et al., 2017), CM ($\Delta = -21\%$, range: -18% to 2%) (Kelly et al., 2019; Martin-Garcia et al., 2018; A. L. Owen et al., 2017) and WM ($\Delta = -24\%$, range: -26% to -21%) (Kelly et al., 2019; Martin-Garcia et al., 2018; A. L. Owen et al., 2017).

M-4 vs. M-2

A small decrement was observed in TD for the CD ($\Delta = -11\%$, range: -18% to -9%) (Kelly et al., 2019; Martin-Garcia et al., 2018; A. L. Owen et al., 2017).

M-4 vs. M-3

No substantial differences were observed within this time points (Table 11).

3.5.2 Acquisition training vs. Pre-Game

M-4 vs. M-1

There was a moderate decrement in TD for the CM ($\Delta = -36\%$, range: -48% to -31%) (Kelly et al., 2019; Martin-Garcia et al., 2018; A. L. Owen et al., 2017) and a large reduction for WD ($\Delta = -41\%$, range: -48% to -32%) (Kelly et al., 2019; Martin-Garcia et al., 2018; A. L. Owen et al., 2017) and CF ($\Delta = -38\%$, range: -48% to -22%) (Kelly et al., 2019; Martin-Garcia et al., 2018; A. L. Owen et al., 2017). The effect was moderate in the sprint distance for WD ($\Delta = -88\%$, range: -91% to -81%) (Martin-Garcia et al., 2018; A. L. Owen et al., 2017).

M-3 vs. M-1

A moderate decrement in TD was analysed for WM ($\Delta = -33\%$, range: -52% to -39%) (Kelly et al., 2019; Martin-Garcia et al., 2018; A. L. Owen et al., 2017). There were large reductions in TD for the CD ($\Delta = -27\%$, range: -53% to -38%) (Kelly et al., 2019; Martin-Garcia et al., 2018; A. L. Owen et al., 2017), WD ($\Delta = -33\%$, range: -52% to -37%) (Kelly et al., 2019; Martin-Garcia et al., 2018; A. L. Owen et al., 2017), CM ($\Delta = -27\%$, range: -52% to -34%) (Kelly et al., 2019; Martin-Garcia et al., 2018; A. L. Owen et al., 2017) and CF ($\Delta = -31\%$, range: -52% to -25%) (Kelly et al., 2019; Martin-Garcia et al., 2018; A. L. Owen et al., 2017). The effect was moderate in VHRS for CM ($\Delta = -63\%$, range: -79% to -54%) (Kelly et al., 2019; A. L. Owen et al., 2017).

M-2 vs. M-1

There was a moderate impairment in TD for the CD ($\Delta = -35\%$, range: -26% to -47%) (Kelly et al., 2019; Martin-Garcia et al., 2018; A. L. Owen et al., 2017) and CM ($\Delta = -26\%$, range: -17% to -37%) (Kelly et al., 2019; Martin-Garcia et al., 2018; A. L. Owen et al., 2017). In the TD, the effect was large for the CF ($\Delta = -29\%$, range: -45% to -15%) (Kelly et al., 2019; Martin-Garcia et al., 2018; A. L. Owen et al., 2017). The effect was moderate in the sRPE for the CD ($\Delta = -39\%$, range: -42% to -35%) (Kelly et al., 2019; A. L. Owen et al., 2017) and WD field positions ($\Delta = -38\%$, range: -38%) (Kelly et al., 2019; A. L. Owen et al., 2017).

Table 5 - Summary of findings from meta-analysis describing the comparison between the load during training sessions vs. Game.

		M+1 VS. M*								M+2 VS. M*							
		r=0.3		r=0.5		r=0.7				r=0.3		r=0.5		r=0.7			
	Stu; S (n)	%adj	g	I ²	g	I ²	g	I ²	Stu; S (n)	%adj	g	I ²	g	I ²	g	I ²	
TD	1; 14	47%	1.90 (0.9; 2.9)		1.70 (0.9; 2.5)		1.40 (0.8 a 2.0)		1;26	45%	2.52 (1.6; 3.4)	0	2.60 (1.7; 3.5)	23	2.70 (1.8; 3.6)	54	
HSR																	
VHSR									1;26	20%	3,97 (2,6; 5,4)		3.96 (2.8; 5.1)		3,95 (2.9; 5.0)		
Sprint	1;14	15%	1.21 (0.4; 2.0)		1.12 (0.5; 1.8)		0.98 (0.5; 1.6)										
HIR	1;14	19%	2.48 (1.2; 3.7)		2.24 (1.3; 3.2)		1.87 (1.2; 2.5)		1;26	24%	2.45 (1.6; 3.4)	0	2.49 (1.6; 3.4)	20	2.56 (1.8; 3.4)	52	
VHIR	1;14	19%	1.8 (0.9; 2.8)		1.70 (0.9; 2.5)		1.46 (0.9; 2.0)										
Acc ^{High}	1;14	45%	0.81 (0.1; 1.5)		0.75 (0.2; 1.3)		0.65 (0.2; 1.1)										
Dec ^{High}	1;14	22%	1.81 (0.8; 2.8)		1.66 (0.9; 2.5)		1.42 (0.9; 2.0)										
PL	1;14	31%	2.32 (1.2; 3.5)		2.13 (1.2; 3.1)		1.83 (1.2; 2.5)										
TRIMP	1;14	23%	2.49 (1.3; 3.7)		2.29 (1.3; 3.3)		1.96 (1.3; 2.6)										
sRPE	1;14	7%	5.35 (3.7 a 7.0)		5.21 (3.8; 6.6)		4.92 (3.9; 5.9)		3;68	48%	1.76 (1.2; 2.3)	28	1.71 (1.2; 2.2)	42	1.62 (1.2; 2.1)	58	
		M-4 VS. M*								M-3 VS. M*							
		r=0.3		r=0.5		r=0.7				r=0.3		r=0.5		r=0.7			
	Stu; S (n)	%adj	g	I ²	g	I ²	g	I ²	Stu; S (n)	%adj	g	I ²	g	I ²	g	I ²	
TD	3;53	58%	1.54 (1.0; 2.1)	17	1.59 (1.0; 2.1)	41	1.61 (1.1; 2.2)	66	3;53	61%	1.76 (1.0; 2.5)	52	1.79 (1.1; 2.5)	64	1.78 (1.1; 2.5)	77	
HSR	2;25	35%	2.63 (-0.5; 5.7)	86	2.32 (-0.4; 5.0)	90	1.87 (-0.2; 4.0)	93	2;25	40%	2.32 (0.3; 4.3)	76	2.17 (0.3; 4.0)	84	1.89 (0.3; 3.5)	89	
VHSR	3;51	25%	2.21 (1.5; 2.9)	21	2.17 (1.5; 2.9)	45	2.05 (1.4; 2.7)	69	3;53	25%	2.27 (1.7; 2.9)	1	2.25 (1.6; 2.9)	30	2.18 (1.5; 2.8)	62	
Sprint	2;27	49%	0.83 (0.3; 1.3)	0	0.80 (0.4; 1.2)	0	0.74 (0.4; 1.1)	0	3;39	35%	1.41 (0.2; .7)	81	1.27 (0.2; 2.3)	83	1.06 (0.3; 1.8)	85	
HIR	2;40	32%	1.68 (1.1; 2.3)	7	1.78 (1.2; 2.4)	31	1.80 (1.2; 2.3)	55	2;40	40%	1.81 (0.9; .7)	50	1.89 (1.0; 2.8)	64	1.93 (1.1; 2.8)	78	
VHIR	1;14	47%	0.97 (0.2; 1.7)		0.97 (0.4; 1.6)		0.97 (0.5; 1.4)		1;14	67%	0.61 (0.0; 1.3)		0.61 (0.1; 1.2)		0.61 (0.2; 1.0)		
Acc ^{High}	1;14	77%	0.30 (-0.3; 0.9)		0.30 (-0.2; 0.8)		0.29 (-0.1; 0.7)		1;14	87%	0.17 (-0.4; 0.8)		0.17 (-0.3; 0.7)		0.16 (-0.2; 0.6)		
Dec ^{High}	1;14	55%	0.88 (0.2; 1.6)		0.88 (0.3; 1.5)		0.88 (0.4; 1.3)		1;14	73%	0.53 (-0.1; 1.2)		0.53 (0.0; 1.1)		0.53 (0.1; 0.9)		

PL	1;14	60%	1.06 (0.3; 1.8)		1.06 (0.4; 1.7)		1.06 (0.6; 1.6)		1;14	72%	0.78 (0.1; 1.5)		0.78 (0.2; 1.4)		0.78 (0.3; 1.2)		
TRIMP	1;14	52%	1.19 (0.4; 2.0)		1.19 (0.5; 1.9)		1.19 (0.7; 1.7)		1;14	66%	0.86 (0.2; 1.6)		0.85 (0.3; 1.4)		0.85 (0.4; 1.3)		
sRPE	2;39	65%	1.05 (0.5; 1.6)	32	1.10 (0.5; 1.7)	52	1.11 (0.6; 1.7)	71	3;68	56%	1.63 (1.0; 2.3)	55	1.60 (1.0; 2.2)	67	1.53 (0.9; 2.1)	78	
M-2 VS. M*									M-1 VS. M*								
			r=0.3		r=0.5		r=0.7					r=0.3		r=0.5		r=0.7	
	Stu; S (n)	%adj	g	I ²	g	I ²	g	I ²	Stu; S (n)	%adj	g	I ²	g	I ²	g	I ²	
TD	3;53	48%	2.19 (1.6; 2.8)	0	2.26 (1.6; 2.9)	37	2.31 (1.6; 3.0)	70	3;53	36%	2.92 (2.0; 3.8)	24	2.95 (2.0; 3.9)	51	2.92 (2.0; 3.9)	76	
HSR	2;25	27%	2.90 (0.0; 5.8)	83	2.60 (0.1; 5.1)	87	2.14 (0.1; 4.2)	91	2;25	7%	3.37 (1.4; 5.4)	59	2.97 (1.2; 4.8)	71	2.40 (0.9; 3.9)	82	
VHSR	3;53	21%	2.59 (1.8; 3.4)	19	2.60 (1.8; 3.4)	46	2.60 (1.7; 3.4)	73	3;53	9%	3.08 (2.3; 3.9)	0	2.95 (2.2; 3.8)	30	2.94 (2.0; 3.9)	70	
Sprint	2;27	25%	1.67 (0.7; 2.6)	60	1.50 (0.8; 2.2)	61	1.26 (0.8; 1.76)	58	3;39	4%	1.89 (1.1; 2.7)	40	1.65 (1.0; 2.3)	45	1.33 (0.9; 1.8)	52	
HIR	2;40	24%	2.45 (1.7; 3.2)	0	2.40 (1.8; 3.1)	9	2.48 (1.7; 3.2)	55	2;40	17%	2.82 (2.0; 3.7)	0	2.79 (2.0; 3.6)	19	2.88 (2.0; 3.8)	63	
VHIR	1;14	30%	1.55 (0.7; 2.4)		1.5 (0.7; 2.2)		1.3 (0.8; 1.9)		1;14	14%	1.95 (0.9; 3.0)		1.75 (0.9; 2.3)		1.45 (0.9; 2.0)		
Acc ^{High}	1;14	66%	0.48 (-0.1; 1.1)		0.48 (-0.1; 1.0)		0.44 (0.0; 0.8)		1;14	53%	0.61 (0.0; 1.3)		0.60 (0.1; 1.1)		0.60 (0.2; 1.0)		
Dec ^{High}	1;14	37%	1.40 (0.6; 2.2)		1.35 (0.7; 2.1)		1.26 (0.7; 1.8)		1;14	25%	1.74 (0.8; 2.7)		1.60 (0.8; 2.4)		1.40 (0.8; 1.9)		
PL	1;14	39%	2.06 (1.0; 3.1)		1.92 (1.1; 2.8)		1.68 (1.1; 2.3)		1;14	32%	2.29 (1.1; 3.5)		2.12 (1.2; 3.0)		1.83 (1.2; 2.5)		
TRIMP	1;14	29%	2.29 (1.1; 3.5)		2.1 (1.2; 3.1)		1.84 (1.2; 2.5)		1;14	23%	2.49 (1.3; 3.7)		2.28 (1.3; 3.3)		1.95 (1.3; 2.6)		
sRPE	3;68	40%	2.71 (1.7; 3.7)	62	2.70 (1.7; 3.7)	72	2.68 (1.7; 3.7)	82	3;68	32%	3.16 (2.0; 4.3)	59	3.14 (2.0; 4.3)	70	3.10 (2.0; 4.2)	81	

J - x = x days before the game; Std: Studies; S: Sample; n: Number; g: Size of the effect (g of Hedges); Hypothetical correlation values of $r = x$; % adj: Percentage adjusted to the sample; I^2 : Value of heterogeneity; TD: Total Distance travelled; HSR: High speed running; VHSR: Very high speed running; HIR: High intensity running; VHIR: Very high intensity running; Acc: Acceleration; Dec: Deceleration; PL: Player load; TRIMP: Impulse training; sRPE: Rating perceived of effort session ; Gray hilglighted color: representes data from a single study; *: Positive values favour match (M).

Table 6 - Summary of findings from meta-analysis describing the training load during the recovery days vs. acquisition days.

			M-5 VS. M+2*						M-4 VS. M+2*								
			r=0.3		r=0.5		r=0.7					r=0.3		r=0.5		r=0.7	
	Stu; S (n)	Δ	g	I ²	g	I ²	g	I ²	Stu; S (n)	Δ	g	I ²	g	I ²	g	I ²	
TD	1;29	13%	-0.54 (-1.0;-0.1)		-0.53 (-0.9;-0.2)		-0.53 (-0.8;-0.2)		5;126	4%	-0.02 (-0.5;0.5)	80	0.05 (-0.04;0.6)	86	0.16 (-0.4;0.7)	92	
HSR	1;29	73%	-1.11 (-1.7;-0.6)		-1.11 (-1.6;-0.7)		-1.11 (-1.5;-0.8)		1;29	-9%	0.16 (-0.3;0.6)		0.15 (-0.2;0.5)		0.14 (-0.1;0.4)		
VHSR									1;26	10%	-0.09 (-0.4;0.3)		-0.09 (-0.4 ;0.2)		-0.08 (-0.3;0.2)		
Sprint									1;33	557%	-0.75 (-1.2;-0.3)		-0.75 (-1.1;-0.4)		-0.75 (-1.1;-0.5)		
HIR									1;26	-3%	-0.01 (-0.4;0.3)		-0.01 (-0.3;0.3)		-0.01 (-0.2;0.2)		
VHIR	1;29	184%	-1.17 (-1.7;-0.6)		-1.10 (-1.6;-0.6)		-0.97 (-1.3;-0.6)		4;100	273%	-0.33 (-1.2;0.5)	90	0.31 (-1.1;0.5)	92	-0.28 (-1.0;0.5)	95	
AccTotal									2;52	52%	-1.08 (-1.9;-0.3)	72	-1.08 (-1.8; -0.3)	79	-1.06 (-1.7;-0.4)	85	
DecTotal									1;33	20%	-0.92 (-1.4;-0.4)		-0.92 (-1.3;-0.5)		-0.91 (-1.2;-0.6)		
PL	1;29	22%	-0.92 (-1.4;-0.4)		-0.91 (-1.3;-0.5)		-0.88 (-1.2;-0.6)		2;62	9%	-0.34 (-0.8; 0.1)	56	-0.34 (-0.8;0.1)	68	-0.33 (-0.8;0.1)	81	
sRPE									2;39	8%	-0.16 (-0.5;0.2)	0	-0.16 (-0.4;0.1)	11	-0.15 (-0.4;0.1)	46	
			M-3 VS. M+2*						M-2 VS. M+2*								
			r=0.3		r=0.5		r=0.7					r=0.3		r=0.5		r=0.7	
	Stu; S (n)	Δ	g	I ²	g	I ²	g	I ²	Stu; S (n)	Δ	g	I ²	g	I ²	g	I ²	
TD	4;93	9%	-0.11 (-0.7;0.5)	80	-0.03 (-0.6;0.6)	86	0.10 (-0.5;0.7)	91	5;126	-9%	0.38 (-0.1;0.9)	80	0.44 (-0.1;1.0)	86	0.55 (0.0;1.1)	91	
HSR	1;29	9%	-0.15 (-0.6;0.3)		-0.15 (-0.5;0.2)		-0.14 (-0.4;0.1)		1;29	-7%	0.12 (-0.3;0.5)		0.12 (-0.2;0.5)		0.12 (-0.2;0.4)		
VHSR	1;26	30%	-0.18 (-0.5;0.2)		-0.18 (-0.5;0.1)		-0.18 (-0.4;0.1)		1;26	1%	-0.03 (-0.4;0.3)		-0.03 (-0.3;0.3)		-0.03 (-0.3;0.2)		
Sprint									1;33	300%	-0.42 (-0.8;0.0)		-0.41 (-0.7;-0.1)		-0.41 (-0.7;-0.1)		
HIR	1;26	14%	-0.07 (-0.4;0.3)		-0.07 (-0.4;0.3)		-0.07 (-0.3;0.2)		1;26	-13%	0.08 (-0.3;0.4)		0.08 (-0.2;0.4)		0.08 (-0.2;0.3)		
VHIR	3;67	210%	0.21 (-1.3;1.7)	94	0.23 (-1.2;1.7)	96	0.25 (-1.1;1.6)	97	4;100	190%	0.08 (-0.9;1.1)	91	0.15 (-0.8;1.1)	93	0.20 (-0.7;1.1)	96	
AccTotal	1;19	53%	-0.96 (-1.5;-0.4)		-0.94 (-1.4;-0.5)		-0.89 (-1.3;-0.5)		2;52	3%	-0.04 (-0.3;0.3)	0	-0.04 (-0.3;0.2)	0	-0.04 (-0.2;0.2)	0	
DecTotal									1;33	-1%	0.07 (-0.3;0.5)		0.07 (-0.3;0.4)		0.07 (-0.2;0.3)		
PL	1;29	0%	-0.01 (-0.4;0.4)		-0.1 (-0.4;0.3)		-0.01 (-0.3;0.3)		2;62	-5%	0.26 (-0.4;0.9)	76	0.26 (-0.4;0.9)	83	0.26 (-0.3;0.9)	90	
sRPE	3;68	19%	-0.28 (-0.5;0.0)	0	-0.28 (-0.5;-0.1)	0	-0.25 (-0.5;0.0)	32	3;68	-17%	0.28 (-0.1;0.6)	30	0.30 (0.0;0.6)	47	0.30 (0.0;0.6)	64	

J - x = x days before the game; Std: Studies; S: Sample; n: Number; g: Size of the effect (g of Hedges); Hypothetical correlation values of r = x; Δ: Percentage of variation; I²: Value of heterogeneity; TD: Total Distance travelled; HSR: High speed running; VHSR: Very high speed running; HIR: High intensity running; VHIR: Very high intensity running; Acc: Acceleration; Dec: Deceleration; PL: Player load; sRPE: Rating perceived of effort session; Gray highlighted color: represents data from a single study; *: Positive values favour M+2.

Table 7 - Summary of findings from the meta-analysis describing the comparison between training load within the Microcycle (acquisition training days).

			<i>M-3 VS. M-2*</i>					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	8;160	-19%	0.79 (0.4;1.2)	66	0.80 (0.5;1.1)	75	0.80 (0.5;1.1)	85
HSR	3;54	-27%	0.95 (0.0;1.9)	81	0.98 (0.0;1.9)	86	0.98 (0.1;1.9)	91
VHSR	4;67	-27%	0.27 (0.0;0.5)	0	0.28 (0.1;0.5)	16	0.26 (0.1;0.5)	31
Sprint	4;67	-44%	0.43 (0.2;0.7)	4	0.40 (0.1;0.7)	31	0.36 (0.1;0.6)	59
HIR	2;40	-31%	0.32 (0.0;0.6)	3	0.30 (0.0;0.6)	21	0.28 (0.0;0.6)	39
VHIR	5;105	-25%	0.79 (0.1;1.5)	85	0.80 (0.1;1.5)	89	0.79 (0.2;1.4)	93
Acc _{Total}	1;19	-30%	-0.77 (-1.3;-0.2)		-0.77 (-1.2;-0.3)		-0.77 (-1.1;-0.4)	
Acc _{High}	2;38	-17%	0.35 (0.0;0.7)	0	0.34 (0.0;0.7)	0	0.34 (0.1;0.6)	0
Dec _{Total}								
Dec _{High}	2;38	-23%	0.47 (-0.1;1.1)	50	0.48 (-0.1;1.0)	62	0.47 (-0.1;1.0)	74
PL	2;43	-23%	0.77 (0.3;1.2)	9	0.75 (0.4;1.1)	14	0.70 (0.5;1.0)	3
sRPE	5;101	-27%	0.72 (0.3;1.2)	55	0.79 (0.4;1.2)	67	0.90 (0.5;1.3)	80
			<i>M-4 VS. M-2**</i>					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	9;193	-13%	0.53 (0.2;0.9)	68	0.56 (0.2;0.9)	77	0.60 (0.3;0.9)	86
HSR	3;54	-10%	0.72 (-0.2;1.7)	82	0.72 (-0.2;1.6)	87	0.70 (-0.2;1.6)	92
VHSR	4;67	1%	0.07 (-0.2;0.3)	5	0.08 (-0.2;0.3)	30	0.09 (-0.2;0.3)	54
Sprint	4;67	-40%	0.30 (-0.1;0.7)	57	0.30 (-0.1;0.6)	68	0.28 (0.0;0.6)	79
HIR	2;40	-21%	0.18 (-0.1;0.5)	0	0.17 (-0.1;0.4)	0	0.16 (0.0;0.4)	0
VHIR	6;138	-20%	0.69 (0.0;1.3)	88	0.72 (0.1;1.4)	91	0.75 (0.2;1.4)	94
Acc _{Total}	2;52	-28%	1.0 (0.4;1.5)	48	0.98 (0.5;1.5)	62	0.99 (0.5;1.5)	77
Acc _{High}	2;38	-17%	0.43 (0.0;0.9)	23	0.42 (0.0;0.9)	46	0.41 (0.0;0.9)	68
Dec _{Total}	1;33	-18%	1.06 (0.6;1.6)		1.06 (0.6;1.5)		1.06 (0.7;1.4)	
Dec _{High}	2;38	-21%	0.44 (0.1;0.8)	0	0.44 (0.1;0.8)	0	0.43 (0.2;0.7)	0
PL	3;76	-17%	0.56 (0.3;0.9)	0	0.55 (0.3;0.8)	0	0.52 (0.3;0.7)	0
sRPE	4;68	-7%	0.64 (0.1;1.2)	70	0.68 (0.1;1.2)	78	0.71 (0.2;1.3)	86
			<i>M-4 VS. M-3***</i>					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	8;160	9%	-0.31 (-0.6;0.0)	59	-0.30 (-0.6;0.0)	70	-0.30 (-0.6;0.0)	81
HSR	3;54	45%	-0.64 (-1.9;0.7)	89	-0.63 (-1.9;0.6)	92	-0.57 (-1.7;0.5)	94
VHSR	4;67	93%	-0.16 (-0.5;0.2)	47	-0.16 (-0.5;0.2)	59	-0.15 (-0.5;0.2)	69
Sprint	4;67	39%	0.08 (-0.3;0.4)	49	0.08 (-0.3;0.4)	61	0.08 (-0.2;0.4)	73
HIR	2;40	21%	-0.14 (-0.5;0.2)	0	-0.14 (-0.4; 0.1)	0	-0.14 (-0.3;0.1)	0
VHIR	5;105	7%	0.24 (-0.3;0.8)	82	0.26 (-0.3;0.8)	87	0.29 (-0.3;0.8)	92
Acc _{Total}	1;19	-16%	-0.46 (-1.0;0.0)		-0.46 (-0.9;-0.1)		-0.46 (-0.8;-0.1)	
Acc _{High}	2;38	0%	0.08 (-0.3;0.5)	0	0.07 (-0.3;0.4)	24	0.06 (-0.3;0.4)	54
Dec _{Total}								
Dec _{High}	2;38	8%	-0.05 (-0.6;0.5)	51	-0.06 (-0.6;0.5)	65	-0.07 (-0.6;0.5)	79
PL	2;43	5%	-0.05 (-0.4;0.4)	20	-0.06 (-0.5;0.3)	41	-0.08 (-0.5;0.3)	63
sRPE	4;68	16%	-0.56 (-1.0;0.0)	60	-0.62 (-1.1;-0.1)	71	-0.69 (-1.2;-0.2)	82

J - x = x days before the game; Std: Studies; S: Sample; n: Number; g: Size of the effect (g of Hedges); Hypothetical correlation values of $r = x$; Δ: Percentage of variation; I^2 : Value of heterogeneity; TD: Total Distance travelled; HSR: High speed running ; VHSR: Very high speed running; HIR: High intensity running; VHIR: Very high intensity running; Acc: Acceleration; Dec: Deceleration; PL: Player load; sRPE: Rating perceived of effort session; Gray highlighted color: represents data from a single study; *: Positive values favour M-3; **: Positive values favour M-4; ***: Positive values favour M-4.

Table 8 - Summary of findings from the meta-analysis describing the comparison between training load on the acquisition days vs. Pre-Game day.

			M-5 VS. M-1*									M-4 VS. M-1*					
			r=0.3		r=0.5		r=0.7					r=0.3		r=0.5		r=0.7	
Stu; S (n)	Δ		g	I ²	g	I ²	g	I ²	Stu; S (n)	Δ		g	I ²	g	I ²	g	I ²
TD	1;29	-35%	-1.87 (-2.6;-1.2)		-1.85 (-2.4;-1.3)		-1.79 (-2.2;-1.3)		9;193	-40%		-1.52 (-2.1;-0.9)	80	-1.58 (-2.5;-1.2)	86	-1.70 (-2.3;-1.1)	91
HSR	1;29	-65%	-2.14 (-2.9;-1.4)		-2.02 (-2.7;-1.4)		-1.82 (-2.3;-1.4)		3;54	-49%		-2.43 (-4.3;-0.5)	87	-2.63 (-4.5;-0.8)	90	-2.83 (-4.6;-1.1)	94
VHSR									4;67	-50%		-0.40 (-0.7;-0.1)	39	-0.41 (-0.7;-0.1)	55	-0.44 (-0.7;-0.1)	72
Sprint									5;97	-87%		-0.78 (-1.1;-0.4)	41	-0.74 (-1.1;-0.4)	53	-0.67 (-1.0;-0.4)	67
HIR									2;40	-43%		-0.36 (-0.7;0.0)	0	-0.34 (-0.6;-0.1)	0	-0.30 (-0.5;-0.1)	0
VHIR	1;29	-63%	-1.07 (-1.6;-0.5)		-1.05 (-1.5;-0.6)		-1.01 (-1.4;-0.7)		6;138	-68%		-1.15 (-1.9;-0.4)	86	-1.18 (-1.9;-0.5)	90	-1.24 (-1.9;-0.6)	94
AccTotal									2;52	-35%		-1.23 (-2.5;0.0)	89	-1.24 (-2.5;0.0)	92	-1.23 (-2.5;0.1)	95
AccHigh									3;38	-46%		-1.22 (-3.0;0.6)	91	-1.20 (-2.9;0.0)	94	-1.15 (-2.8;0.5)	96
DecTotal									1;33	-46%		-2.83 (-3.7;-1.9)		-2.81 (-3.6;-2.0)		-2.78 (-3.4;-2.2)	
DecHigh									2;38	-52%		-1.35 (-2.6;-0.1)	82	-1.31 (-2.6;-0.1)	88	-1.22 (-2.5;0.0)	93
PL	1;29	-31%	-1.50 (-2.1;-0.9)		-1.49 (-2.0;-1.0)		-1.49 (-1.9;-1.1)		3;76	-32%		-1.03 (-1.5;-0.5)	57	-1.01 (-1.5;-0.5)	70	-0.96 (-1.5;-0.4)	83
sRPE									4;68	-30%		-0.99 (-1.5;-0.5)	53	-1.09 (-1.6;-0.6)	67	-1.22 (-1.7;-0.7)	80
			M-3 VS. M-1*									M-2 VS. M-1*					
			r=0.3		r=0.5		r=0.7					r=0.3		r=0.5		r=0.7	
Stu; S (n)	Δ		g	I ²	g	I ²	g	I ²	Stu; S (n)	Δ		g	I ²	g	I ²	g	I ²
TD	8;160	-44%	-1.78 (-2.4;-1.1)	78	-1.81 (-2.5;-1.2)	84	-1.85 (-2.5;-1.3)	90	9;193	-31%		-1.32 (-1.8;-0.8)	78	-1.37 (-1.9;-0.9)	84	-1.45 (-2.0;-1.0)	90
HSR	3;54	-62%	-2.56 (-4.4;-0.8)	82	-2.39 (-4.0;-0.8)	86	-2.08 (-3.3;-0.9)	89	3;54	-44%		-1.35 (-2.5;-0.2)	84	-1.40 (-2.5;-0.3)	88	-1.38 (-2.4;-0.3)	92
VHSR	4;67	-68%	-0.81 (-1.2;-0.5)	33	-0.80 (-1.1;-0.5)	44	-0.74 (-1.0;-0.5)	55	4;67	-53%		-0.49 (-0.8;-0.2)	24	-0.50 (-0.8;-0.2)	42	-0.49 (-0.8;-0.2)	61
Sprint	4;64	-80%	-0.67 (-1.1;-0.2)	55	-0.64 (-1.0;-0.2)	66	-0.58 (-0.9;-0.2)	77	5;97	-69%		-0.49 (-0.8;-0.2)	32	-0.48 (-0.8;-0.2)	44	-0.44 (-0.7;-0.2)	57
HIR	2;40	-50%	-0.50 (-0.8;-0.2)	0	-0.48 (-0.8;-0.2)	0	-0.44 (-0.7;-0.2)	25	2;40	-29%		-0.32 (-0.6;0.0)	0	-0.32 (-0.6;-0.1)	0	-0.31 (-0.5;-0.1)	0
VHIR	5;105	-66%	-1.45 (-2.4;-0.5)	87	-1.50 (-2.4;-0.6)	91	-1.57 (-2.4;-0.7)	94	6;138	-61%		-0.82 (-1.4;-0.3)	80	-0.86 (-1.4;-0.3)	85	-0.95 (-1.5;-0.4)	91
AccTotal	1;19	-3%	-0.08 (-0.5;0.4)		-0.08 (-0.5;0.3)		-0.08 (-0.3;0.2)		2;52	-4%		-0.15 (-2.1;1.8)	96	-0.15 (-2.1;1.8)	97	-0.16 (-2.1;1.8)	98
AccHigh	2;38	-46%	-1.04 (-2.1;0.1)	82	-1.00 (-2.0;0.0)	85	-0.94 (-1.8;-0.1)	93	3;38	-35%		-0.79 (-2.0;0.4)	86	-0.77 (-1.9;0.4)	89	-0.73 (-1.8;0.3)	93
DecTotal									1;33	-35%		-1.85 (-2.5;-1.2)		-1.84 (-2.4;-1.3)		-1.84 (-2.3;-1.4)	
DecHigh	2;38	-54%	-1.34 (-1.9;-0.8)	0	-1.26 (-1.7;-0.8)	0	-1.12 (-1.5;-0.8)	0	2;38	-39%		-0.90 (-1.7;-0.1)	71	-0.87 (-1.7;-0.1)	78	-0.81 (-1.6;-0.1)	85
PL	2;43	-29%	-0.96 (-1.4;-0.5)	17	-0.92 (-1.3;-0.5)	21	-0.85 (-1.1;-0.6)	10	3;76	-17%		-0.52 (-1.0;-0.1)	55	-0.52 (-1.0;-0.1)	68	-0.52 (-1.0;-0.1)	81
sRPE	5;97	-49%	-1.27 (-1.7;-0.8)	36	-1.33 (-1.8;-0.9)	54	-1.43 (-1.9;-0.5)	71	5;97	-28%		-0.72 (-1.1;-0.4)	45	-0.76 (-1.1;-0.4)	56	-0.81 (-1.1;-0.5)	73

J - x = x days before the game; Std: Studies; S: Sample; n: Number; g: Size of the effect (g of Hedges); Hypothetical correlation values of $r = x$; Δ: Percentage of variation; I^2 : Value of heterogeneity; TD: Total Distance travelled; HSR: High speed running; VHSR: Very high speed running; HIR: High intensity running; VHIR: Very high intensity running; Acc: Acceleration; Dec: Deceleration; PL: Player load; sRPE: Rating perceived of effort session; Gray highlighted color: represents data from a single study; *: Positive values favour M-1.

Table 9 - Summary of findings from the meta-analysis describing the comparison within acquisition days by field position: M-3 vs. M-2*.

			CD					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;10	-17%	0.52 (0.0;1.1)	0	0.51 (0.1;1.0)	0	0.48 (0.1;0.8)	0
VHSR	2;7	-19%	0.16 (-0.4;0.7)	0	0.15 (-0.3;0.6)	0	0.14 (-0.2;0.5)	0
Sprint	2;6	94%	-0.02 (-0.6;0.6)	0	-0.01 (-0.5;0.5)	0	0.01 (-0.4;0.5)	30
sRPE	2;7	-37%	1.42 (-1.4;4.2)	66	1.54 (-1.3;4.4)	76	1.66 (-1.2;4.5)	86
			WD					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;13	-19%	0.50 (0.0;1.0)	0	0.48 (0.1;0.9)	0	0.48 (0.1;0.9)	31
VHSR	2;7	-25%	0.19 (-0.4;0.8)	0	0.19 (-0.3;0.7)	0	0.19 (-0.2;0.6)	0
Sprint	2;9	-55%	0.38 (-0.2;1.0)	0	0.37 (-0.1;0.9)	0	0.36 (-0.1;0.8)	35
sRPE	2;7	-38%	0.93 (-0.2;2.0)	24	1.00 (-0.1;2.1)	45	1.06 (-0.1;2.2)	66
			CM					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;14	-21%	0.69 (0.1;1.3)	0	0.66 (0.2;1.1)	0	0.61 (0.3;1.0)	0
VHSR	2;11	-40%	0.47 (-0.1;1.1)	0	0.46 (-0.1;1.0)	0	0.44 (0.0;0.8)	0
Sprint	2;7	-67%	0.35 (-0.3;1.0)	0	0.32 (-0.2;0.8)	0	0.28 (-0.1;0.7)	0
sRPE	2;11	-44%	2.16 (-0.9;5.2)	66	2.27 (-0.8;5.4)	76	2.36 (-0.7;5.4)	85
			WM					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;11	-24%	0.58 (0.0;1.1)	0	0.55 (0.1;1.0)	0	0.51 (0.2;0.9)	0
VHSR	2;6	-31%	0.26 (-0.3;0.8)	0	0.26 (-0.2;0.7)	0	0.25 (-0.1;0.6)	0
Sprint	2;8	-68%	0.39 (-0.2;1.0)	0	0.36 (-0.2;0.9)	0	0.32 (-0.1;0.7)	0
sRPE	2;6	-43%	1.25 (-1.3;3.8)	67	1.36 (-1.2;-3.9)	76	1.45 (-1.1;4.1)	86
			CF					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;18	-17%	0.61 (-0.2;1.5)	60	0.64 (-0.2;1.5)	70	0.63 (-0.1;1.4)	80
VHSR	2;11	-6%	0.22 (-0.6;1.1)	45	0.24 (-0.6;1.1)	60	0.26 (-0.6;1.1)	75
Sprint	2;10	-80%	0.59 (-0.2;1.3)	28	0.54 (-0.1;1.2)	41	0.46 (-0.1;1.0)	53
sRPE	2;11	-27%	1.84 (-1.8;5.4)	68	1.99 (-1.7;5.7)	78	2.14 (-1.6;5.9)	87

J - x = x days before the game; Std: Studies; S: Sample; n: Number; g: Size of the effect (g of Hedges); Hypothetical correlation values of $r = x$; Δ : Percentage of variation; I^2 : Value of heterogeneity; TD: Total Distance travelled; VHSR: Very high speed running; sRPE: Rating perceived of effort session; Gray highlighted color: represents data from a single study; CD: Central Defender; WD: Wide Defender; CM: Central Midfielder; WM: Wide Midfielder; CF: Central Forward; *: Positive Values favour M-3.

Table 10 - Summary of findings from the meta-analysis describing the comparison within acquisition days by field position: M-4 vs. M-2*.

			CD					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;10	-11%	0.44 (-0.1;1.0)	0	0.44 (0.0;0.9)	0	0.43 (0.1;0.8)	0
VHSR	2;7	-5%	0.03 (-0.5;0.6)	0	0.03 (-0.5;0.5)	0	0.03 (-0.3;0.4)	0
Sprint	2;6	-38%	0.21 (-0.4;0.8)	0	0.21 (-0.3;0.7)	6	0.22 (-0.3;0.7)	40
sRPE	2;7	-21%	0.76 (-0.8;2.4)	61	0.80 (-0.8;2.4)	72	0.82 (-0.7;2.3)	82
			WD					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;13	-9%	0.21 (-0.4;0.9)	38	0.21 (-0.4;0.9)	55	0.22 (-0.4;0.9)	73
VHSR	2;7	15%	-0.11 (-0.7;0.5)	0	-0.10 (-0.6;0.4)	0	-0.10 (-0.5;0.3)	0
Sprint	2;9	-33%	0.45 (-1.1;2.0)	78	0.46 (-1.03;2.0)	84	0.45 (-1.0;1.9)	90
sRPE	2;7	-18%	0.46 (-0.4;1.3)	25	0.49 (-0.4;1.3)	46	0.52 (-0.3;1.4)	68
			CM					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;14	-14%	0.35 (-0.2;0.9)	0	0.35 (-0.1;0.8)	10	0.33 (-0.1;0.8)	36
VHSR	2;11	-14%	0.11 (-0.5;0.7)	0	0.11 (-0.4;0.6)	0	0.11 (-0.3;0.5)	19
Sprint	2;7	-24%	0.14 (-0.4;0.7)	0	0.14 (-0.4;0.6)	0	0.14 (-0.2;0.5)	0
sRPE	2;11	-31%	1.08 (-0.1;2.3)	39	1.15 (-0.1;2.4)	57	1.22 (-0.1;2.5)	74
			WM					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;11	-15%	0.31 (-0.2;0.8)	0	0.32 (-0.2;0.8)	22	0.33 (-0.1;0.8)	49
VHSR	2;6	22%	-0.12 (-0.7;0.4)	0	-0.12 (-0.6;0.4)	0	-0.12 (-0.5;0.2)	0
Sprint	2;8	-14%	0.18 (-0.8;1.1)	54	0.16 (-0.7;1.0)	62	0.13 (-0.6;0.9)	71
sRPE	2;6	-27%	0.53 (-0.5;1.5)	41	0.58 (-0.4;1.6)	58	0.62 (-0.4;1.7)	75
			CF					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;18	-13%	0.46 (-0.2;1.1)	33	0.46 (-0.1;1.0)	48	0.45 (-0.1;1.0)	63
VHSR	2;11	-17%	0.20 (-0.4;0.7)	0	0.19 (-0.3;0.7)	0	0.17 (-0.2;0.5)	0
Sprint	2;10	-52%	0.24 (-0.4;0.9)	23	0.21 (-0.4;0.8)	32	0.17 (-0.3;0.6)	42
sRPE	2;11	-14%	1.08 (-1.4;3.5)	70	1.16 (-1.3;3.6)	78	1.21 (-1.2;3.6)	87

J - x = x days before the game; Std: Studies; S: Sample; n: Number; g: Size of the effect (g of Hedges); Hypothetical correlation values of $r = x$; Δ : Percentage of variation; I^2 : Value of heterogeneity; TD: Total Distance travelled; VHSR: Very high speed running; sRPE: Rating perceived of effort session; Gray highlighted color: represents data from a single study; CD: Central Defender; WD: Wide Defender; CM: Central Midfielder; WM: Wide Midfielder; CF: Central Forward; *: Positive Values favour M-4.

Table 11 - Summary of findings from the meta-analysis describing the comparison within acquisition days by field position: M-4 vs. M-3*.

CD								
	Stu; S (n)	Δ	<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
			<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;10	8%	-0.19 (-0.7;0.3)	0	-0.18 (-0.6;0.2)	0	-0.18 (-0.6;0.2)	0
VHSR	2;7	17%	-0.08 (-0.7;0.5)	0	-0.08 (-0.6;0.4)	0	-0.08 (-0.5;0.3)	0
Sprint	2;6	-60%	0.32 (-0.3;0.9)	0	0.30 (-0.2;0.8)	0	0.28 (-0.1;0.7)	0
sRPE	2;7	26%	-0.86 (-2.6;0.9)	61	-0.92 (-2.6; 0.8)	72	-0.95 (-2.6;0.7)	83
WD								
	Stu; S (n)	Δ	<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
			<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;13	11%	-0.32 (-0.8;0.2)	0	-0.31 (-0.7;0.1)	0	-0.30 (-0.6;0.0)	0
VHSR	2;7	52%	-0.28 (-0.9;0.3)	0	-0.28 (-0.8;0.2)	0	-0.28 (-0.7;0.1)	0
Sprint	2;9	38%	0.22 (-0.8;1.2)	60	0.23 (-0.7;1.2)	69	0.25 (-0.6;1.1)	79
sRPE	2;7	33%	-0.61 (-1.3;0.1)	0	-0.61 (-1.2;0.0)	0	0.62 (-1.2;-0.1)	23
CM								
	Stu; S (n)	Δ	<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
			<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;14	10%	-0.23 (-0.7;0.2)	0	-0.23 (-0.6;0.2)	0	-0.22 (-0.5;0.1)	0
VHSR	2;11	45%	-0.29 (-0.9;0.3)	0	-0.28 (-0.8;0.2)	0	-0.26 (-0.7;0.1)	0
Sprint	2;7	140%	-0.27 (-0.9;0.3)	0	-0.25 (-0.8;0.3)	0	-0.21 (-0.6;0.2)	0
sRPE	2;11	26%	-1.18 (-3.5;1.1)	72	-1.24 (-3.5;1.0)	80	-1.30 (-3.5;0.9)	88
WM								
	Stu; S (n)	Δ	<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
			<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;11	11%	-0.24 (-0.7;0.3)	0	-0.23 (-0.6;0.2)	0	-0.23 (-0.5;0.1)	0
VHSR	2;6	78%	-0.32 (-0.9;0.3)	0	-0.32 (-0.8;0.2)	0	-0.31 (-0.7;0.1)	0
Sprint	2;8	114%	-0.03 (-0.6;0.6)	0	-0.02 (-0.6;0.5)	13	0.01 (-0.5;0.5)	34
sRPE	2;6	31%	-0.79 (-2.6;1.0)	66	-0.85 (-2.7;1.0)	76	-0.90 (-2.7;0.9)	85
CF								
	Stu; S (n)	Δ	<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
			<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;18	5%	-0.17 (-0.6;0.3)	0	-0.17 (-0.6;0.2)	0	-0.18 (-0.5;0.2)	25
VHSR	2;11	-9%	0.06 (-0.5;0.6)	0	0.06 (-0.4;0.5)	0	0.06 (-0.3;0.4)	0
Sprint	2;10	126%	-0.15 (-0.7;0.4)	0	-0.14 (-0.6;0.3)	0	-0.11 (-0.5;0.2)	0
sRPE	2;11	19%	-0.99 (-2.9;0.9)	63	-1.06 (-3.0;0.9)	73	-1.09 (-2.9;0.7)	83

J - x = x days before the game; Std: Studies; S: Sample; n: Number; g: Size of the effect (g of Hedges); Hypothetical correlation values of $r = x$; Δ : Percentage of variation; I^2 : Value of heterogeneity; TD: Total Distance travelled; VHSR: Very high speed running; sRPE: Rating perceived of effort session; Gray highlighted color: representes data from a single study; CD: Central Defender; WD: Wide Defender; CM: Central Midfielder; WM: Wide Midfielder; CF: Central Forward; *: Positive Values favour M-3.

Table 12 - Summary of findings from the meta-analysis describing the comparison between acquisition days and pre-game by field position: M-4 vs. M-1*.

CD								
	Stu; S (n)	Δ	<i>r</i> =0.3		<i>r</i> =0.5		<i>r</i> =0.7	
			<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;10	-42%	-1.56 (-3.3;0.1)	52	-1.71 (-3.4;0.0)	66	-1.84 (-3.6;-0.1)	80
VHSR	2;7	-59%	-0.32 (-0.9;0.3)	0	-0.29 (-0.8;0.2)	0	-0.25 (-0.6;0.1)	0
Sprint	2;6	-81%	-0.43 (-1.1;0.2)	0	-0.40 (-0.9;0.1)	0	-0.36 (-0.7;0.0)	0
sRPE	2;7	-53%	-1.76 (-4.9;1.3)	64	-1.91 (-5.1;1.3)	74	-2.04 (-5.3;1.2)	85
WD								
	Stu; S (n)	Δ	<i>r</i> =0.3		<i>r</i> =0.5		<i>r</i> =0.7	
			<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;13	-41%	-1.37 (-2.6;-0.1)	54	-1.43 (-2.7;-0.2)	67	-1.47 (2.7;-0.2)	80
VHSR	2;7	-38%	-0.28 (-0.9;0.3)	0	-0.27 (-0.8;0.2)	0	-0.27 (-0.7;0.1)	0
Sprint	2;9	-88%	-1.06 (-1.9;-0.2)	0	-0.98 (-1.7;-0.3)	12	-0.86 (-1.5;-0.2)	40
sRPE	2;7	-49%	-1.11 (-2.7;0.5)	49	-1.19 (-2.9;0.5)	63	-1.24 (-2.9;0.4)	77
CM								
	Stu; S (n)	Δ	<i>r</i> =0.3		<i>r</i> =0.5		<i>r</i> =0.7	
			<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;14	-36%	-1.17 (-1.9;-0.5)	0	-1.14 (-1.7;-0.5)	0	-1.08 (-1.5;-0.6)	0
VHSR	2;11	-52%	-0.46 (-1.1;0.1)	0	-0.45 (-1.0;0.1)	0	-0.43 (-0.8;0.0)	0
Sprint	1;4	-80%	-0.55 (-1.5;0.4)	0	-0.51 (-1.3;0.3)	0	-0.44 (-1.0;0.2)	0
sRPE	2;11	-51%	-2.34 (-5.9;1.2)	69	-2.45 (-6.0;1.1)	78	-2.49 (-5.9;0.9)	87
WM								
	Stu; S (n)	Δ	<i>r</i> =0.3		<i>r</i> =0.5		<i>r</i> =0.7	
			<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;11	-42%	-0.98 (-2.0;0.0)	47	-1.03 (-2.0;0.0)	62	-1.06 (-2.0;-0.1)	76
VHSR	2;6	-44%	-0.22 (-0.8;0.3)	0	-0.22 (-0.7;0.3)	0	-0.21 (-0.6;0.1)	0
Sprint	2;8	-79%	-0.48 (-1.1;0.1)	0	-0.45 (-1.0;0.1)	0	-0.39 (-0.8;0.0)	0
sRPE	2;6	-53%	-1.49 (-4.6;1.6)	70	-1.57 (-4.7;1.5)	78	-1.59 (-4.5;1.3)	87
CF								
	Stu; S (n)	Δ	<i>r</i> =0.3		<i>r</i> =0.5		<i>r</i> =0.7	
			<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;18	-38%	-1.55 (-2.9;-0.2)	60	-1.60 (-3.0;-0.2)	72	-1.64 (-3.1;-0.2)	84
VHSR	2;11	-50%	-0.52 (-1.1;0.1)	0	-0.48 (-1.0;0.0)	0	-0.42 (-0.8;0.0)	0
Sprint	1;7	-85%	-0.61 (-1.5;0.2)	0	-0.55 (-1.3;0.2)	0	-0.46 (-1.0;0.1)	0
sRPE	2;11	-38%	-2.25 (-6.6;2.1)	69	-2.43 (-6.9;2.0)	78	-2.58 (-7.1;1.9)	87

J - x = x days before the game; Std: Studies; S: Sample; n: Number; g: Size of the effect (g of Hedges); Hypothetical correlation values of *r* = x; Δ : Percentage of variation; *I*²: Value of heterogeneity; TD: Total Distance travelled; VHSR: Very high speed running; sRPE: Rating perceived of effort session; Gray highlighted color: representes data from a single study; CD: Central Defender; WD: Wide Defender; CM: Central Midfielder; WM: Wide Midfielder; CF: Central Forward; *: Positive Values favour M-1.

Table 13 - Summary of findings from the meta-analysis describing the comparison between acquisition days and pre-game by field position: M-3 vs. M-1*.

			CD					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;10	-27%	-1.23 (-2.4;-0.1)	31	-1.30 (-2.5;-0.1)	49	-1.34 (-2.4;-0.2)	69
VHSR	2;7	-66%	-0.67 (-1.6;0.3)	27	-0.64 (-1.5;0.2)	35	-0.58 (-1.2;0.0)	40
Sprint	2;6	-43%	-0.19 (-0.8;0.4)	0	-0.18 (-0.7;0.3)	0	-0.16 (-0.5;0.2)	0
sRPE	2;7	-62%	-1.76 (-4.9;1.3)	64	-2.47 (-6.4;1.5)	73	-2.55 (-6.4;1.3)	84
			WD					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;13	-33%	-1.30 (-2.3;-0.3)	30	-1.31 (-2.2;-0.4)	46	-1.27 (-2.1;-0.5)	62
VHSR	2;7	-59%	-0.54 (-1.2;0.1)	0	-0.53 (-1.1;0.0)	0	-0.52 (-1.0;-0.1)	0
Sprint	2;9	-83%	-0.58 (-1.2;0.1)	0	-0.53 (-1.1;0.0)	8	-0.49 (-1.0;0.1)	45
sRPE	2;7	-61%	-1.47 (-3.1;0.1)	31	-1.54 (-3.1;0.0)	47	-1.55 (-3.0;-0.1)	62
			CM					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;14	-27%	-1.32 (-2.1;-0.5)	0	-1.28 (-1.9;-0.6)	0	-1.20 (-1.7;-0.7)	0
VHSR	2;11	-63%	-0.74 (-1.4;-0.1)	0	-0.73 (-1.3;-0.2)	0	-0.71 (-1.1;-0.3)	0
Sprint	1;4	-93%	-0.46 (-1.4;0.5)	0	-0.40 (-1.2;0.4)	0	-0.31 (-0.9;0.3)	0
sRPE	2;11	-59%	-3.22 (-8.0;1.6)	70	-3.28 (-7.9;1.3)	78	-3.18 (-7.3;1.0)	86
			WM					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;11	-33%	-1.06 (-1.9;-0.2)	27	-1.10 (-2.0;-0.2)	45	-1.10 (-1.9;-0.3)	62
VHSR	2;6	-66%	-0.54 (-1.2;0.1)	0	-0.54 (-1.1;0.0)	0	-0.53 (-1.0;-0.1)	0
Sprint	2;8	-72%	-0.39 (-1.0;0.2)	0	-0.36 (-0.9;0.1)	0	-0.32 (-0.7;0.1)	0
sRPE	2;6	-63%	-2.11 (-6.5;2.3)	71	-2.18 (-6.4;2.0)	79	-2.12 (-5.9;1.7)	87
			CF					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;18	-31%	-1.68 (-3.1;-0.3)	57	-1.75 (-3.1;-0.4)	69	-1.81 (-3.2;-0.4)	82
VHSR	2;11	-42%	-0.63 (-1.7;0.4)	42	-0.62 (-1.6;0.3)	52	-0.57 (-1.3;0.2)	63
Sprint	1;7	-86%	-1.05 (-2.1;0.0)	0	-0.98 (-1.8;-0.2)	0	-0.86 (-1.5;-0.2)	0
sRPE	2;11	-46%	-2.84 (-7.7;2.1)	65	-3.06 (-8.1;1.9)	75	-3.24 (-8.3;1.8)	85

J - x = x days before the game; Std: Studies; S: Sample; n: Number; g: Size of the effect (g of Hedges); Hypothetical correlation values of $r = x$; Δ : Percentage of variation; I^2 : Value of heterogeneity; TD: Total Distance travelled; VHSR: Very high speed running; sRPE: Rating perceived of effort session; Gray highlighted color: represents data from a single study; CD: Central Defender; WD: Wide Defender; CM: Central Midfielder; WM: Wide Midfielder; CF: Central Forward; *: Positive Values favour M-1.

Table 14 - Summary of findings from the meta-analysis describing the comparison between acquisition days and pre-game by field position: M-2 vs. M-1*.

			CD					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;10	-35%	-1.00 (-2.0;0.0)	27	-1.09 (-2.1;-0.1)	47	-1.17 (-2.1;-0.2)	68
VHSR	2;7	-60%	-0.39 (-1.0;0.2)	0	-0.36 (-0.9;0.2)	0	-0.31 (-0.7;0.1)	0
Sprint	2;6	-59%	-0.19 (-0.7;0.4)	0	-0.18 (-0.6;0.3)	0	-0.16 (-0.5;0.2)	0
sRPE	2;7	-39%	-0.78 (-1.6;0.0)	0	-0.77 (-1.4;-0.1)	0	-0.75 (-1.3;-0.2)	0
			WD					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;13	-34%	-1.29 (-2.6;0.1)	60	-1.34 (-2.7;0.0)	72	-1.37 (-2.7;-0.1)	83
VHSR	2;7	-43%	-0.35 (-1.0;0.3)	0	-0.35 (-0.9;0.2)	0	-0.34 (-0.8;0.1)	14
Sprint	2;9	-60%	-0.45 (-1.1;0.2)	0	-0.42 (-0.9;0.1)	0	-0.37 (-0.8;0.0)	0
sRPE	2;7	-38%	-0.69 (-1.4;0.1)	0	-0.68 (-1.3;-0.1)	0	-0.69 (-1.2;-0.1)	21
			CM					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;14	-26%	-1.04 (-2.0;-0.1)	32	-1.13 (-2.1;-0.2)	51	-1.21 (-2.2;-0.2)	70
VHSR	2;11	-39%	-0.33 (-0.9;0.3)	0	-0.33 (-0.8;0.2)	0	-0.32 (-0.7;0.1)	0
Sprint	1;4	-76%	<i>-0.40 (-1.3;0.5)</i>	<i>0</i>	<i>-0.36 (-1.1;0.4)</i>	<i>0</i>	<i>-0.31 (-0.9;0.3)</i>	<i>0</i>
sRPE	2;11	-29%	-1.11 (-3.1;0.8)	68	-1.16 (-3.1;0.8)	77	-1.18 (-3.0;0.7)	86
			WM					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;11	-32%	-0.87 (-1.9;0.1)	51	-0.90 (-1.9;0.1)	65	-0.92 (-1.9;0.0)	78
VHSR	2;6	-43%	-0.35 (-0.9;0.2)	0	-0.35 (-0.9;0.2)	0	-0.35 (-0.7;0.0)	0
Sprint	2;8	11%	-0.15 (-0.8;0.5)	5	-0.13 (-0.7;0.4)	15	-0.10 (-0.6;0.3)	26
sRPE	2;6	-36%	-0.78 (-2.4;0.9)	63	-0.82 (-2.4;0.8)	73	-0.81 (-2.3;0.7)	83
			CF					
			<i>r=0.3</i>		<i>r=0.5</i>		<i>r=0.7</i>	
	Stu; S (n)	Δ	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²	<i>g</i>	<i>I</i> ²
TD	3;18	-29%	-1.31 (-2.5;-0.1)	56	-1.34 (-2.5;-0.2)	68	-1.33 (-2.4;-0.3)	79
VHSR	2;11	-46%	-0.58 (-1.2;0.0)	0	-0.56 (-1.1;0.0)	0	-0.52 (-0.9;-0.1)	0
Sprint	1;7	-12%	<i>-0.06 (-0.8;0.7)</i>	<i>0</i>	<i>-0.05 (-0.7;0.6)</i>	<i>0</i>	<i>-0.05 (-0.5;0.4)</i>	<i>0</i>
sRPE	2;11	-29%	-0.98 (-2.1;0.2)	32	-1.07 (-2.3;0.2)	52	-1.15 (-2.4;0.1)	71

J - x = x days before the game; Std: Studies; S: Sample; n: Number; g: Size of the effect (g of Hedges); Hypothetical correlation values of $r = x$; Δ : Percentage of variation; I^2 : Value of heterogeneity; TD: Total Distance travelled; VHSR: Very high speed running; sRPE: Rating perceived of effort session; Gray highlighted color: represents data from a single study; CD: Central Defender; WD: Wide Defender; CM: Central Midfielder; WM: Wide Midfielder; CF: Central Forward; *: Positive Values favour M-1.

4. Discussion

The objective of this systematic review with meta-analysis was to describe the external and internal training loads experienced by soccer players during the competitive microcycle. Comparative analyses were performed between the different training sessions and the game (M+1 to M-1 vs. Game) and between the different training periods of the microcycle (days typically considered acquisition vs. recovery days vs. pre-game). This analysis was also carried out considering the individual player's positions. The main findings were as follows: the total distance, very-high speed running (VHSR) and sprint distance and the sRPE are the most commonly used indicators to characterize the training load during the competitive microcycle, both at group and individual level. The weekly training load (sum of the training load during the week excluding the game data) for total distance, HIR, HSR and sRPE was higher than the reported during the game. On the other hand, the VHSR and the sprint distance performed during the game was higher than the accumulated during the week. Generally, the external and internal training load increases until days M-4 and M-3, then decreasing until day M-1. From an individual position analysis perspective, there were no significant differences in the external (high-speed running) and internal load (sRPE) experienced through the distinct acquisition training days. However, we observed substantial significant differences in the total distance between acquisition and pre-game training sessions (e.g. M-3 vs. M-1, for all positions).

4.1 Training load distribution during training sessions vs match-play

The distribution of the training loads during the week can impact team performance and/or the risk of injury (*Castagna et al., 2011; Ekblom & Golobarg, 1971; Jaspers et al., 2017; Los Arcos et al., 2015; Los Arcos et al., 2014; Manzi et al., 2013*). The manipulation of training load targets a better control of the training stimulus and allow the "best possible" readiness for training and match-play. Given that elite soccer players compete on a weekly basis, the appropriate adjustment of the intensity and volume of training is of central importance in preparing for the game. From a training planification standpoint, it is essential to allow players to proper recover from the game and from acquisitive training days, so that they can present in the best possible physical and psychological conditions to compete. Regarding the weekly individual

training load, we observed that the duration of the training and the total distance seems to vary substantially during the microcycle (273min to 399min and 26541m to 35294m, respectively). For example, the total distance of the training sessions (excluding the game), had a CV of 33% and represented almost two and a half times the distance covered in the game. The amplitude found in the total distance suggests that there is a high individual variability of the load between and within teams during training sessions and not just during the game (*Rago et al., 2019*). Nowadays a large proportion of the training stimuli is delivered mainly through reduced games designs (*Fradua et al., 2013; Gaudino et al., 2013; Hill-Haas et al., 2011*). This training exercises differ greatly in formats, conditioning of the task, duration and dimension of the space and mainly, functions required of each player what may explain at least in part this findings (*Fradua et al., 2013; Gaudino et al., 2013; Hill-Haas et al., 2011*). All of these variables are widely described as moderating the external and internal load experienced by the players (*Fradua et al., 2013; Gaudino et al., 2013; Hill-Haas et al., 2011*). On the other hand, it may be merely explained by the frequency of sessions performed within the analysed competitive microcycles (ranging from four to six sessions) as an increase in the number of sessions will potential produce an increase in the training load (*F. M. Clemente et al., 2019*). Importantly, in relation to the distance covered at high intensity/speed, the game represents a large part of the weekly stimulus, since the total weekly load is even lower than the values observed during a single game. For example, the VH SR and the sprint distance represent 53% and 61% of the game load, respectively. It was also possible to observe that, as the limit of the speed threshold is decreased, this difference tends to be smaller (e.g. HIR: 46%). Another relevant aspect is regarding the changes in running kinetic during the game. We observed that the acceleration_{high} represents only 23% of the weekly load, showing a trend contrary to what was observed in the others high intensity running parameters previously described. This fact, despite being observed in a single study, seems to indicate that players perform more than twice the volume of accelerations during the training sessions of the microcycle observed in the game. These data highlight the importance of the game as a training (conditioning) stimulus for the ability to perform very high intensity activity (VH SR and sprint distance), which corroborates the conclusions of several studies (*Morgans et al., 2018; Silva et al., 2011; Sporis et al., 2011*), while

training sessions are prominent in training the ability to accelerate and brake. Thus, it is essential to supplement non-starters and non-selected players, through high intensity running exercises, in order to cope with match specific physical demands. Interestingly, there is some evidence that specific external load metrics play an important role in the organization of the training process (fatigue and adaptation) (Curtis *et al.*, 2019). For example, high-intensity running may represent the most sensitive external load metric to monitor changes in the state of acute (immediately after the training or match) and residual (M+24h) muscle damage (Hader *et al.*, 2019). Similarly Gastin *et al.* (2019), refer that the variables of high intensity running and changes in running kinetics (e.g. deceleration, acceleration and sprint distance) are the strongest predictors of recovery after the game (e.g. CK concentrations). In addition, the cumulative exposure or major weekly changes in high intensity running can represent a substantial increase in the risk of injury (e.g. hamstring muscle strain) (Bowen *et al.*, 2017; Filipe Manuel Clemente, Pantelis Theodoros Nikolaidis, *et al.*, 2019; Gabbett, 2020; Jones *et al.*, 2016; Malone *et al.*, 2018), whereas high but gradual exposure to high intensity running can provide additional protection to spikes in the workload of football players (Gabbett *et al.*, 2017). For this reason, in practice, football coaches are concerned with exposing athletes to a certain weekly “dose” of specific locomotor activities, which is often complemented with exercises performed after the formal part of the training session (e.g. complementary training).

In microcycles with one game a week, there seem to be two major “training stimuli”, one in the middle of the week and the other consisting of the game. In the remaining training sessions, there seems to be a concern with reducing the training load for allow players recovery. In the present study it was possible to observe a daily variation (moderate to very large) in external and internal load parameters throughout the training week. Specifically, total duration, total distance, VHSR and sRPE showed higher values on days M-4 (91min, 4673 m, 118 m and 336 a.u, respectively) and M-3 (91 min, 4872 m, 154 m, 336 a.u., respectively), with a progressive decrease of these values on M-2 and M-1 (87 min, 3876 m, 113 m, 232 a.u., respectively and 81 min, 2952 m, 70 m, 177 a.u., respectively). The observed oscillation in training load throughout the microcycle time-frame reflect coaches concern with players physiological recovery (Impellizzeri *et al.*, 2004; Kelly & Coutts, 2007; Adam L Owen

et al., 2017), by minimizing the cumulative effects of fatigue (*Issurin*, 2010), the reduction of monotony and the maximization of adaptations to training (*Impellizzeri et al.*, 2004; *Kelly & Coutts*, 2007). This strategy aims to facilitate the recovery of fatigue accumulated over the week (including the previous game) and ensure the “best possible” performance in the next game (*Impellizzeri et al.*, 2004). Although several contextual factors (e.g. opponent’s level, position on the playing field and individual playing time) (*Morgans et al.*, 2018) influence the load experienced by a player during match-play, it’s well accepted that it represents the main determinant of a high weekly training load (*Los Arcos et al.*, 2016). Therefore, we can even consider that the load experienced in the game is the biggest determinant of the training load of the competitive microcycle. In this matter, despite the training units M-4 and M-3 showing the highest training load values within the different training sessions, in any moment the “training” values surpass the observed during the game, both in terms of volume and intensity (*Anderson et al.*, 2016; *Silva et al.*, 2011; *Sporis et al.*, 2011). As so, gain insight to the load experienced by each individual player in the previous match constitutes one of the fundamental steps for determine the training stimuli that should be deliver in the oncoming acquisition training days (*F. M. Clemente et al.*, 2019; *Jaspers et al.*, 2017). These differences in game load per player can be amplified if we consider that only 11 players can start the official game, which results in a considerable number of players not being exposed to the game load (*Los Arcos et al.*, 2017). As a result, within the same team, considerable individual differences in external and/or internal game load can be found (e.g. TD, sprint distance and sRPE) (*Akubat et al.*, 2012; *F. M. Impellizzeri et al.*, 2005; *Los Arcos et al.*, 2015; *Manzi et al.*, 2013). The starting players accumulate higher loads than the non-starter and non-selected players, being the playing time the main reason for these differences (*Los Arcos et al.*, 2017; *Los Arcos et al.*, 2016). As earlier mentioned, the game seems to represent the main source for VHSR and sprint stimuli during the competitive microcycle. Practitioners should acknowledge this specific load differences and allow within the microcycle complementary stimulus of this locomotor demands both for non-starters and non-selected players.

4.2 Training load characterization within the different microcycle training periods: Group analysis

We were able to perform a meta-analytic approach for compare training load metrics within and between the different training periods of the competitive microcycle such as, recovery days, acquisition and pre-game training days (Table 6). However, we found limited information about the former (24h and 48h post-game). This may be due to the fact that this training period is aimed at recovery and therefore of less intensity and duration (*Impellizzeri et al., 2004*). We can also attribute the paucity of data regarding the post-game days to the fact that the coaches have scheduled complementary training for players who were non-starters or non-selected. Therefore, it is possible to assume that the examined studies may not describe recovery training practices (M+1 and M+2), since there are players in different physical status. This fact may explain, at least in part, the absence of significant differences between the recovery sessions (M+1 and M+2) and the remaining training sessions (M-4, M-3, M-2 and M-1). As evidenced in the study of *Martin-Garcia et al. (2018)*, players who did not complete 60 minutes of play, performed a complementary training, consisting of a technical circuit and reduced games with goalkeeper, in order to compensate for lost game loads. The magnitude of the training load resulting from the additional session held for non-starters/non-selected players was considered high for the TD, acceleration and deceleration, due to the small number of players used in this session (*Owen et al., 2011*). However, *Los Arcos et al. (2017)* show that the accumulated game load of the regular players is higher than that of the non-starters players even performing complementary training. Similarly, *Jaspers et al. (2017)* analysed the training load of starters and non-starters players and found that playing time had a central role in maintaining or improving physical fitness. Therefore, coaches should be aware of the risk of underloading non-starters players (*Kraemer et al., 2004*).

In the present systematic review, it was possible to observe a significant variation in acceleration_{Total} values (Δ : 52%) from day M+2 to M-4. Additionally, the most demanding training sessions took place in the middle of the microcycle (M-4 and M-3, table 6). Specifically, there was a significantly greater sRPE (Δ : 16%) in M-3 than in M-4 (Table 7). Moreover, total distance (Δ : 9%) and HSR (Δ : 45%) were substantially

greater in M-3 than in M-4. Instead, VHIR (Δ : 7%) was substantially greater in M-4 than on day M-3.

The weekly training load variations seems to highpoint that coaches tend to decrease training load not only in M-1, but already 48 hours before the game. In fact, from M-3 to M-2 is possible to observe small to moderate reduction in volume and intensity-based metrics (e.g. TD, HSR and VHIR). This is further supported by a significantly small and/or moderate variation from M-4 to M-2 in some metrics such as total distance (Δ : -13%), VHIR (Δ : -20%) and sRPE (Δ : -7%). *Silva et al. (2018)* found in a systematic review that the specific locomotor pattern of football (e.g. game) induces acute and residual fatigue (which may be evident even 72 hours after the activity). Namely, changes in specific performance markers (e.g. intermittent high-intensity exercise and neuromuscular capacity), metabolic (e.g. muscle glycogen), biochemical (e.g. inflammatory markers and musculoskeletal injury) and perceptive (e.g. delayed onset muscle soreness and fatigue) are observed within this period. As such, the observed data seems to reflect the methodological concern of reduce the training load in the M-2 training unit. This decrease aims to allow the recovery of the players' physical capacities (after the game or after the more *acquisitive* days) to increase the player's readiness and minimize the risk of injuries (*Silva et al., 2013*). Regarding the M-1, it is characterized by being a day when there is a substantial reduction in the external and internal training load. This reduction in training load is obvious from day M-3 to day M-1 (HSR, VHSR, sprint distance, HIR and VHIR). On average, a decrease of 66% (amp: 46% to 78%, with moderate to very large effect) was observed in the intensity metrics. Moreover, from M-3 to M-1 we examined a large decrease that was by average 44% in total distance and 57% in sRPE. This reduction would be expected considering that an increase in these metrics is associated with fatigue (*Hader et al., 2019*) and training sessions with high intensity and long duration close to a game will produce a negatively impact in players performance during match-play (*Rowell et al., 2018; Thorpe et al., 2017*). Consequently, an efficient training strategy will be the prescription of training with a “downgrade” in the intensity and volume training variables (*Rey et al., 2018*). This can mirror the unpredictable nature inherent in game-based training and the strategies used by coaches to vary training stimulus, so that players adapt to training and game, and the different conceptions of

teams' tactical preparation for play (Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019).

4.3 Training load characterization within the different microcycle training periods: Positional analysis

One of the aims of our systematic review was also to pave the way on the characterization of the training load during typical competitive microcycle from a specific position perspective. It was possible to characterize and compare both specific external (total distance, VHSR and the sprint distance) and internal load metrics (sRPE) during the acquisition training moments and their relationship with the pre-game day (Table 9-14). The positional analysis suggests of a reduced variation between training session. However, the weekly variation pattern examined in the group analysis, was maintained. Days M-2 and M-1 showed lower training loads than days M-4 and M-3, independently of field position. When comparing the acquisition days, no significant differences were observed in M-4 vs. M-3 and M-4 vs. M-2. Only in M-3 vs. M-2 a significant difference was found for the TD, of moderate magnitude for all positions excepting for CF. These results suggest the coaches' concern to reduce the training load in the 48 hours preceding the game for all the players independently of their position role, specifically regarding the total running volume. However, although certain data do not show statistical significance, some metrics deserve meticulous analysis. For example, the analysis of the sRPE confidence interval, may suggest that the values for the WD are higher in M-4 (amp: -1.2 to 0.0) than in M-3 (Table 11). Additionally, we observed moderate to very large effects on the variation of TD and sRPE between acquisition days and M-1. In contrast, there were small to moderate effects for VHSR and sprint distance, respectively. However, trivial effects for CD, WM and CF were analysed in the sprint distance metric between day J-2 and J-1. It is important to highlight that the total distance presented a significant variation between day M-3 and day M-1, regardless of the position in the field. Likewise, significant differences in total distance were observed for WD, CM and CF between M-4 vs. M-1 and for CM and CF between M-2 vs. M-1. Based on these data, we can suggest that M-3 is the training session where players perform more total distance. In addition, this metric tends to be more stable for CD and WM during different sessions of the microcycle. Significant differences were also observed in the sprint distance between

M-4 and M-1, for WD, in VHSR between M-3 and M-1, for CM and in sRPE between M-2 and M-1, for CD. As previously mentioned, although there were no significant differences, certain parameters showed higher values on certain days of the microcycle. For example, when comparing M-4 vs. M-1, the values tend to be “possibly” higher in M-4 in the total distance for CD, in VHSR for CM and CF and sprint distance for WM as the confidence interval does not reach a substantial effect towards M-1 (Table 12). Equally, the values tend to be higher in M-3 in VHSR, sprint distance and sRPE for the WD and in VHSR for the WM (Table 13). In M-2, the total distance for the WM and the VHSR for CF (amp: -1.1 to 0.0) tend to show higher values than in M-1 (Table 14).

In the present study, the position analysis of the distances covered at high intensity/speed, showed very small variations (amp: -0.32 to 0.54; trivial to moderate) between the most demanding physical training sessions (M-4, M-3 and M-2). These findings may support the early suggestions of *Baptista et al. (2020)* of a lack of position specificity of common training sessions adopted by coaches in elite football. On the other hand, this may create a concern regarding the possible monotony of the microcycle training sessions, given that a lack of variation in training load has been associated with an increased incidence of injuries in high-performance athletes, which highlights the need for training load variability across training microcycles, mesocycles and macrocycles (*Foster, 1998*). Thus, it is a relevant finding of this systematic review, the fact that the substantial variability of the external load per position described during match-play, may not be observed in the training sessions that make up the microcycle (*Bradley & Ade, 2018; Bradley et al., 2010; Di Salvo et al., 2010; Di Salvo et al., 2007; Di Salvo et al., 2009; Dupont et al., 2010; Gaudino et al., 2013; Malone et al., 2015; Martin-Garcia et al., 2018; Reilly, 1976*).

It is important to highlight some limitations inherent to this work. One limitation of this systematic review with meta-analysis is the between-study differences in definitions regarding the main players' external load metrics. Actually, studies tend to use different definitions with respect to external load metrics. In fact, there was a variation in the thresholds used by the studies. For example, in the study of *Oliveira, Brito, Martins, Mendes, Calvete, et al. (2019)* the threshold for the sprint distance was defined in “> 24km/h⁻¹”. In the investigation of *Grunbichler et al. (2019)* the same

threshold was considered for speeds “> 25.2 km/h⁻¹”. As highlighted by other authors (Akenhead & Nassis, 2016; Buchheit et al., 2014; Hader et al., 2019), the collection of external load data with different GPS technologies, can induce data collection failures (for example, lack of homogeneous filtration methods, different sampling rates and data processing algorithms). For instance, there can be substantial differences between products, principally for thresholds-based acceleration and deceleration variables (Delaney et al., 2018; Thornton et al., 2019). In addition, the use of individualized external load thresholds (based on the physiological characteristics of the players) (Abt & Lovell, 2009; Lovell & Abt, 2013; Osgnach et al., 2010; Tomazoli et al., 2020), may detect a pattern different from what is observable when using absolute thresholds (Hader et al., 2019; Tomazoli et al., 2020). The number of studies included in our analysis is relatively small, namely about certain metrics (e.g. VHIR, acceleration_{Total}, player load and HR) and for comparisons between training days (e.g. M vs. M-4, M-3, M-2 and M-1), which reduces the impact of our analysis. This may be related to the fact that it is only recently allowed to collect information with *wearables* about the physical and physiological requirements of the competition. On the other hand, only recently has the scientific community tried to describe the training periodization practices in elite soccer teams, including comparing training days on weekly microcycles (Akenhead et al., 2016; Anderson et al., 2016; Brito et al., 2016; Filipe Manuel Clemente, Adam Owen, et al., 2019; Grunbichler et al., 2019; Kelly et al., 2019; Los Arcos et al., 2017; Martin-Garcia et al., 2018; Oliveira, Brito, Martins, Mendes, Calvete, et al., 2019; Oliveira, Brito, Martins, Mendes, Marinho, et al., 2019; Owen A et al., 2019; A. L. Owen et al., 2017; Thorpe et al., 2016). This may explain the absence of an evident pattern in the training load distribution of high-level football teams and more predominantly, when investigating from an individual positional analysis standpoint. Namely, the existence of a standard microcycle with respect to each individual session and load parameter. It is important to emphasize that the studies in question may represent a “photograph” of a specific competitive microcycle where the game that preceded it and the next one may be very different, which may have a different influence on the weekly organization of training, namely at the level of training strategy and consequently of the exercises applied, which in turn may influence the load profile (daily and weekly).

Future investigations on the periodization of training loads could include analysing the relationship between training requirements and the contextual factors of the game, such as the result of the previous game, and the level of the opponent and the location of the previous and subsequent games. With the information collected, soccer coaches will be able to consider the interaction between the variables that influence each player's training responses. Further studies should use individualized external load thresholds, in order to be able to understand and consequently plan and distribute training loads more precisely. Another direction for further investigations may be the characterization of training load patterns after competition for non-starters and non-selected players. Finally, most of the studies analysed do not provide a comprehensive analysis of the external and internal load. For example, of the six studies analysed that included game data in the analysis of the competitive microcycle, only two to three considered metrics of distances covered at different running speeds and internal load percentage data. Likewise, parameters related to changes in running kinetics and cardiac indexes were not considered. This problem is even more evident from an individual perspective, since only two to three studies analysed the weekly load pattern according to the position of the players on the field. Therefore, more research is warranted, as the introduction of more metrics will assist in a more comprehensive view of the trends in weekly training loads adopted by professional teams (Weston, 2018).

5. Conclusion

This article provides a systematic review with meta-analysis where we analyse the external and internal training loads to which professional soccer players are exposed during the typical competitive microcycle. Specific metrics of external (TD, VHSR and sprint distance) and internal load (sRPE) have been the most used indicators to characterize the training load during the microcycle. However, some metrics continue to require further investigation in order to obtain a more comprehensive view of the profile of training loads adopted by professional teams. The comparative analysis of the different training sessions and the game showed that all the metrics of volume and intensity decrease progressively from the most intense trainings (M-4 and M-3) until the day before the game (M-1). Specific training load metrics such as total distance, HIR, HSR and sRPE in the set of training sessions of the microcycle accumulates higher values (108% to 227%) than those registered in the game. However, regarding the metrics VHSR and sprint distance, the values accumulated in all training sessions do not reach competition benchmarks (97% and 91% of game values, respectively). So, competition seems to constitute an important training stimulus for the maintenance/improvement of the player's ability to perform high intensity displacements. About the analysis of the different training sessions, the M-3 was the day when the highest external load values were verified (e.g. TD, VHSR, deceleration_{high}). Contrarily, the decrease in training load is evident in the 48 hours before the game, particularly on day M-1, with a small to moderate reduction in all volume and intensity metrics (66%, from day M-3 to day M-1). Therefore, training sessions of low intensity and reduced volume, are used after the most demanding moments of the microcycle and before the game. Regarding the individual position analysis (CD, WD, CM, WM and CF), the most examined parameters were the TD, the VHSR, the sprint distance and the sRPE. However, given the scarcity of data, it was only possible to make comparisons between acquisition training sessions and between acquisition training sessions and pre-game sessions. The training load by positions did not show great variation between acquisition training sessions, however the weekly pattern of external and internal load between the acquisition training units and the pre-game units observed in the group analysis was maintained.

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