Applied Sciences. The role of veracity on load monitoring of professional soccer players: a systematic review in the face of the Big Data Era. ....

	A	B	C	D	E	Σ
2007 Little and Williams [41]	1	1	2	2	1	7
2009 Moreira et al. [42]	1	1	2	2	1	7
2011 Gomez-Piriz et al. [43]	1	1	2	2	1	7
2012 Akubat et al. [44]	1	1	1	2	1	6
2013 Bara-Filho et al. [45]	1	0	2	1	1	5
2013 Heisterberg et al. [46]	1	1	1	2	1	6
2015 Bujnovsky et al. [47]	1	1	1	1	1	5
2015 Gaudino et al. [48]	1	1	2	2	1	7
2015 Los Arcos et al. [49]	1	1	2	2	1	7
2015 Morcillo et al. [50]	1	1	2	2	1	7
2015 Morgans et al. [51]	1	1	2	1	1	6
2015 Thorpe et al. [52]	1	1	2	2	1	7
2015 Torres-Ronda et al. [53]	1	2	2	2	1	8
2016 Buchheit et al. [54]	1	1	2	2	1	7
2016 Coelho et al. [55]	1	1	2	2	1	7
2016 Ehrmann et al. [56]	1	1	2	2	1	7
2016 García-García et al. [57]	1	2	2	2	1	8
2016 Maya et al. [58]	1	1	2	2	1	7
2016 Moalla et al. [59]	1	1	2	2	1	7
2016 Owen et al. [60]	1	1	2	1	1	6
2016 Rago et al. [61]	1	1	1	1	1	5
2016 Romagnoli et al. [62]	1	1	2	2	1	7
2017 Bacon and Mauger [63]	1	2	1	2	1	7
2017 Barrett [64]	1	1	1	1	1	5
2017 Clemente et al. [65]	1	1	1	2	1	6
2017 Los Arcos et al. [66]	1	1	2	2	1	7

	A		
Criteria	Peer reviewed		
Definition	Study published in peer-reviewed journal		
Scoring	0	1	2
	No	Yes	-
	B		
Criteria	Number of participants		
Definition	Number of participants included in study findings		
Scoring	0	1	2
	<5	6-30	>31
	C		
Criteria	Population defined		
Definition	Age, sex, sport, experience (or level) were described		
	No	Partly	Yes
	D		
Criteria	Experimental design		
Definition	Experimental design was well described and could be replicated		
Scoring	0	1	2
	No	Partly	Yes
	E		
	Load monitoring parameters were described		

Study						Total
2017 Mara et al. [67]	1	1	2	2	1	7
2017 Muñoz-Lopéz et al. [68]	1	1	1	2	1	6
2017 Owen et al. [69]	1	1	2	2	1	7
2017 Owen et al. [70]	1	1	2	2	1	7
2017 Rowell et al. [71]	1	1	2	1	1	6
2018 Abbott et al. [72]	1	1	2	2	1	7
2018 Al Haddad et al. [73]	1	1	1	2	1	6
2018 Barret et al. [74]	1	2	2	1	1	7
2018 Bendala et al. [75]	1	1	1	1	1	5
2018[i] Fanchini et al.	1	0	1	1	1	4
2018 Fitzpatrick et al. [76]	1	1	2	1	1	6
2018 Gomez et al. [77]	1	1	2	1	1	6
2018 Jaspers et al. [78]	1	2	1	2	1	7
2018 Jaspers et al. [79]	1	2	2	2	1	8
2018 Lacome et al. [80]	1	1	1	2	1	6
2018 Malone et al. [81]	1	1	1	2	1	6
2018 Malone et al. [82]	1	0	2	1	1	5
2018 Malone et al. [83]	1	1	1	2	1	6
2018 McCall et al. [84]	1	1	2	2	1	7
2018 Osorio et al. [85]	1	1	2	2	1	7
2018 Owen et al. [86]	1	2	2	2	1	8
2018 Rowell et al. [87]	1	1	2	2	1	7
2018 Rowell et al. [88]	1	1	1	2	1	6
2018 Selmi et al. [89]	1	1	2	2	1	7
2018 Silva et al. [90]	1	1	2	2	1	7
2018 Tang et al. [91]	1	2	2	2	1	8
2018 Vigh-Larsen et al. [92]	1	2	2	2	1	8
2019 Abbott et al. [93]	1	1	2	2	1	7

Definition			
Scoring	0	1	2
	No	Yes	-

2019 Clemente et al. [94]	1	2	2	2	1	8
2019 Clemente et al. [95]	1	1	2	2	1	7
2019 Constantine et al. [96]	1	1	2	2	1	7
2019 Coppalle et al. [97]	1	2	2	2	1	8
2019 Cortê et al. [98]	1	1	1	2	1	6
2019 Costa et al. [99]	1	1	1	2	1	6
2019 Figueiredo et al. [100]	1	1	2	1	1	6
2019 Geurkink et al. [101]	1	2	1	2	1	7
2019 Haller et al. [103]	1	1	1	2	1	6
2019 Izzo et al. [104]	1	0	1	2	1	5
2019 Op De Beéck et al. [105]	1	1	2	2	1	7
2019 Jatene et al. [106]	1	1	1	2	1	6
2019 Lee and Mukherjee [107]	1	1	1	2	1	6
2019 Morales et al. [108]	1	1	2	1	1	6
2019 Moreno-Perez et al. [109]	1	1	1	2	1	6
2019 Noor et al. [110]	1	2	2	2	1	8
2019 Rabbani et al. [111]	1	1	2	2	1	7
2019 Rabbani et al. [112]	1	1	1	2	1	6
2019 Rago et al. [113]	1	1	2	2	1	7
2019 Rossi et al. [114]	1	1	1	2	1	6
2019 Sangnier et al. [115]	1	1	1	2	1	6
2020 Bowen et al. [116]	1	2	2	2	1	8
2020 Clemente et al. [117]	1	1	1	2	1	6
2020 Gonçalves et al. [119]	1	1	2	2	1	7
2020 Granero-Gil et al. [120]	1	1	1	2	1	6
2020 Grunbichler et al. [102]	1	1	2	2	1	7
2020 Houtmeyers et al. [121]	1	1	2	2	1	7
2020 Ibáñez et al. [122]	1	1	2	2	1	7
2020 Lolli et al. [123]	1	1	1	2	1	6

2020 Morandi et al. [124]	1	1	1	2	1	6
2020 Oliva-Lozano et al. [126]	1	1	2	2	1	7
2020 Owen et al. [127]	1	1	1	1	1	5
2020 Quintas et al. [128]	1	2	1	1	1	6
2020 Rago et al. [129]	1	1	2	2	1	7
2020 Rago et al. [130]	1	1	2	2	1	7
2020 Saidi et al. [131]	1	1	2	2	1	7
2020 Springham et al. [132]	1	1	2	2	1	7
2020 Taberner et al. [133]	1	1	2	1	1	6
2020 Wiig et al. [134]	1	1	1	2	1	6
2021 Enes et al. [118]	1	1	1	2	1	6
2021 Muñoz-López et al. [125]	1	1	1	2	1	6

Table S1. Risk of bias score

[i] Fanchini M, Impellizzeri FM, Silbernagel KG, et al. Return to competition after na Achilles tendon rupture using both on and off the field load monitoring as guidance: a case report of a top-level soccer player. Phys Ther Sport 2018;29:70-78.

Study	Study Design (and Duration)	Sample level (n; sex; age; country of sample)	Tools (brand and model or reference); Accuracy reported by the company	Parameters	Veracity analysis (Metrics)
2007 Little and Williams [41]	Observational prospective cohort (90 days)	2nd division of the Country (n = 28; males; 24 ± 5 y; England)	Heart Rate Monitoring (Polar, not reported); not found.	Mean percentage of maximum HR (% HR_{max})	CV = 1.3 – 2.2%
			RPE (Scale 6-20 by Borg, 1982)	Borg RPE scores	CV = 5.1 – 9.9%
2009 Moreira et al. [42]	Experimental pre-post (1 day)	3rd division of the Country (n = 24; males; 23 ± 4 y; Brazil)	Salivary Imunoglobulina A (ELISA; s-IgA EIA kit, ALPCO Diagnostics); Accuracy (Repeatability intra-assay variation): CV = 5.6% – 8.2%	s-IgAabs, IgA-Pro, s-IgArate, Flow rate, Total protein	Not reported
			RPE (Scale 6-20 by Borg, 1982)	Borg RPE scores	Not reported
2011 Gomez-Piriz et al. [43]	Observational prospective cohort (13 days)	1st division of the Country (n = 22; males; 27 ± 4 y; Spain)	EPTS (GPSports, SPI Elite, 1 Hz); Accuracy: CV = 1.5%	Total body load (AU)	Not reported
			RPE (21-point scale, not validated)	session-RPE (AU)	Not reported
2012 Akubat et al. [44]	Observational prospective cohort (49 days)	2nd division of the Country for youth players (n = 9; males; 17 ± 1 y; England)	Heart Rate Monitoring (Polar, Team System); not found.	Banister's TRIMP (Banister, 1991), TRIMP (Stagno et al., 2007) , Individualised TRIMP (Manzi et al., 2009)	Not reported
			Blood Lactate Concentration (Yellow Springs, YSI 2300); Accuracy = ± 2%	Velocity at 2 mmol.L^{-1} (vLT), Heart Rate at 2 mmol.L^{-1} (LTHR), Velocity at 4 mmol.L^{-1} (vOBLA), and Heart Rate at 4 mmol.L^{-1} (OBLAHR)	Not reported
			RPE (Scale 1-10 by Foster et		

			al., 2001)	session-RPE (AU)	Not reported
2013 Bara-Filho et al. [45]	Observational prospective cohort (21 days)	1st division of a State Championship (n = 2; males; 23 ± 5 y; Brazil)	Heart Rate Monitoring (Polar, Polar RS800); Accuracy = 1 bpm for the heart rate monitor and 1ms for the heart rate variability.	TRIMP (Stagno et al., 2007) Mean percentage of maximum HR (% HR_{max}), RMSSD (ms), SDNN (ms), pNN50 (%), HF (ms^2), SD1 (ms)	Not reported
2013 Heisterberg et al. [46]	Observational prospective cohort (180 days)	1st division of the Country (n = 19; males; 26 ± 5 y; Danish)	Blood Samples (Sysmex XE, Sysmex; Abbott Denmark; Ortho Clinical Diagnostics; ILS); Accuracy (Intra-run imprecision Repeatability): 0.34 – 0.36%	Hemoglobin, mean cell hemoglobin, mean cell hemoglobin concentration, Erythrocytes, erythrocyte mean cell volume, Erythrocyte size variation, Reticulocytes, Thrombocytes, Leucocytes, Immature granulocytes, Neutrophilocytes, Eosinophilocytes, Basophilocytes, Lymphocytes, Monocytes, Cobalamin, Iron, Transferrin, Calcium, Potassium, Magnesium, Sodium, Urea, Creatinine, Ferritin, IgA, IgG, IgM, Creatine kinase, Fibrinogen, Bilirubin, Cholesterol, Cholesterol-HDL, Cholesterol-VLDL, Cholesterol-LDL, Triglyceride.	Not reported Not reported Not reported
			Submaximal running test (Yo-Yo Intermittent Endurance Level 2, Bangsbo et al., 2006)	Covered distance and heart rate	
			Maximal oxygen uptake (Metabolic Cart AMIS, INNOVISION); Accuracy: < 1%.	VO_{2MAX}	
2015 Bujnovsky et al. [47]	Observational prospective cohort	1st division of the Country (n = 13; males;	Heart Rate Monitoring (Polar, Polar Team 2); not found.	Average HR (in first half, second half and match), Maximal HR, Time in	Not reported

				Zones 1-5	
	(3 days)	23 ± 4 y; Czech)			
2015 Gaudino et al. [48]	Observational prospective cohort (275 days)	1st division of the Country (n = 26; males; 26 ± 6 y; England)	EPTS (STATSports, Viper, 10 Hz); not found.	total distance (m), high-speed distance (> 14.4 km/h), very-high-speed distance (> 19.8 km/h), very-high-speed runs (> 19.8 km/h; n), impacts (n), dynamic-stress load (AU), accelerations (> 3 m/s^2; n), decelerations (> -3 m/s^2; n), energy expenditure (kcal), high-metabolic-power distance (>25.5 W/kg; m), distance per minute (m/min), high-speed distance per minute (> 14.4 km/h; m/min), very high-speed distance per minute (> 19.8 km/h; m/min), very high-speed runs per minute (> 19.8 km/h; n), impacts per minute (n/min), dynamic stress load per minute (AU/min), accelerations per minute (> 3 m/s^2; n/min), decelerations per minute (> -3 m/s^2; n/min), average metabolic power (W/kg), high metabolic power distance per minute (>25.5 W/kg; m/min).	Not reported
			RPE (Scale 1-10 by Foster et al., 2001)	session-RPE (AU) and Foster RPE scores	Not reported
2015 Los Arcos et al. [49]	Observational prospective cohort (63 days)	1st division of the Country (n = 19; males; 20 ± 2 y; Spain)	Watch (not reported); not found.	Trained/played minutes	CV = 5.5%;
			RPE (Scale 1-10 by Foster et al., 2001)	Respiratory session-RPE, Muscular session-RPE, sum of all Respiratory RPE scores and sum of all Muscular RPE scores	Respiratory session-RPE; CV = 16.2%; ICC = 0.96; SEM = 7.5% Muscular session-RPE; CV = 15.7%; ICC = 0.97; SEM = 7.5% sum of all Respiratory RPE scores; CV = 14.0% sum of all Muscular RPE scores;
			Countermovement Jump Test (Contact mat Newtest, not reported); not found.	Jump height (cm): CMJ, CMJAS, CMJD, CMJnD	

	Study design	Population	Test (instrument); Accuracy	Outcome	Reliability
					CV = 14.5
			Sprint Test (Photocell gates Newtest, not reported); not found.	Sprinting test of 15 m (split times were recorded at 5 m and 15 m).	Not reported
			Blood Lactate Concentration (ArkRay Inc Ltd, Lactate Pro LT-1710TM); Accuracy: CV = 3%.	Velocity at 3 mmol.L^{-1}, blood lactate accumulation at 12 km/h and 13 km/h	Not reported
					Not reported
			Countermovement Jump Test (Microgate, Optojump); Accuracy = 1 ms.	Jump height (cm)	Not reported
			Repeated Sprint Ability (Microgate, Polifemo Radio Light); Accuracy = 0.4 ms	Mean sprint time and the percent sprint decrement (Spencer et al., 2006)	Not reported
2015 Morcillo et al. [50]	Observational cross-sectional (1 day)	1st division of the Country (n = 18; males; 27 ± 4 y; Spain)	Blood Lactate Concentration (ArkRay Inc Ltd, Lactate Pro LT-1710TM); Accuracy: CV = 3%	Blood lactate concentration (Pre- and post-testing; mmol.L^{-1})	Not reported
			Blood Ammonia Concentration (Menarini Diagnostics, PocketChem BA PA-4130); not found.	Blood ammonia concentration (Pre- and post-testing; µg.dL^{-1})	Not reported
2015 Morgans et al. [51]	Observational prospective cohort (28 days)	National Team (n = 13; males; 25 ± 3 y; Wales)	Salivary Imunoglobulina A (IPRO Interactive, not reported); not found.	sIgA (µg/mL)	Not reported
2015 Thorpe et al. [52]	Observational prospective cohort (17 days)	1st division of the Country (n = 10; males; 19 ± 1 y; England)	EPTS (GPSports, SPI Pro X, 5 Hz); not found	Total high-intensity-running (THIR; >14.4 km/h).	Not reported

			Heart Rate Monitoring (Polar, not reported); not found.	Heart-rate reserve (%), RMSSD (ms), Ln RMSSD (ms).	Not reported
			Countermovement Jump Test (Fusion Sport, not reported); not found.	Jump height (cm) Sleep quality, muscle soreness, fatigue.	Not reported
			Psychometric Questionnaire with 7-point Likert scale (Hooper et al., 1995)		Not reported
2015 Torres-Ronda et al. [53]	Experimental crossover randomized controlled trial (2 days)	3rd division of the Country (n = 22; males; 26 ± 5 y; Spain)	EPTS (GPSports, SPI Pro X, 5 Hz); not found.	Body load, total distance covered and exertion index	Not reported
			Heart Rate Monitoring (Polar, Team System, 1 Hz integrated in the GPS units); not found.	TRIMP (Stagno et al., 2007)	Not reported
			RPE (Scale 1-10 by Borg, 1982)	Borg RPE scores	Not reported
2016 Buchheit et al. [54]	Observational prospective cohort (17 days)	1st division of the Country (n = 12; males; 25 ± 5 y; France)	Body Composition (Balance, ADE Electronic Column Scales, ± 0.1 kg); Accuracy = 100 g	Body mass was measured before and after the training sessions.	Not reported
			EPTS (GPSports, SPI Pro, 15 Hz); not found	Covered distance, distance > 25.2 km/h, distance > 19.8 - 25.2 km/h, distance > 14.4 - 19.8 km/h, distance < 14.4 km/h.	Not reported
			.		Not reported
			RPE (Scale 1-10 by Foster et al., 2001).	session-RPE (AU) and Foster RPE scores.	Not reported
			Psychometric Questionnaire with 5-point Likert scale (Hooper et al., 1995)	Perceived fatigue, sleep, mood, soreness, and stress	Not reported
			Neuromuscular Efficiency Index (Accelerometer-derived measures, Athletic Data	Velocity, power and time HR during the last minute.	Not reported

Study	Design	Population	Instrument	Variables	Accuracy/Reliability
			Innovations); not found.		
			Submaximal running test (Submaximal 4-minute running, Heart Rate Monitor, not reported); not found.		
2016 Coelho et al. [55]	Observational prospective cohort (120 days)	1st division of the Country (n = 12; males; 24 ± 4 y; Brazil)	CK (Roche, Reflotron); Accuracy: CV = 3.1%	CK absolute concentration , %CK$_{max}$, %ΔCK$_{max}$.	Not reported
			EPTS (Garmin, Forerunner® 405); Accuracy = ± 5 m	Covered distance	Not reported
			Heart Rate Monitoring (Polar, Team System); not found.	HR, %HR$_{max}$	Not reported
			Watch (not reported); not found.	Trained/played minutes	Not reported
2016 Ehrmann et al. [56]	Observational prospective cohort (259 days)	1st division of the Country (n = 19; males; 26 ± 5 y; Australia)	EPTS (GPSports, SPI Pro, 5 Hz); not found	Total distance covered, High-intensity running (14.3–19.7 km/h), Very–high-intensity running (> 19.7 km/h), Meters per minute, New total body load.	Not reported
2016 García-García et al. [57]	Experimental non-randomized trial (49 days)	1st division of the Country (n = 21; males; 27 ± 3 y; Spain)	Tensiomyography (EMF-FURLAN, TMG-S2); not found.	Maximum radial muscle belly displacement (Dm), Contraction time (Tc), Delay time (Td), Half-relaxation time (Tr).	ICC (Dm) = 0.97, (Tc) = 0.98, (Td) = 0.87, (Tr) = 0.80.
2016 Maya et al. [58]	Experimental pre-post (2 days)	1st division of the Country (n = 22; females; 23 ± 2 y; Chile)	RPE (Scale 1-10 by Foster et al., 2001)	session-RPE (AU)	Not reported
			Salivary Imunoglobulina A, Cortisol and Testosterone (ELISA; Salimetric, not reported); Accuracy (Repeatability intra-assay variation): CV = 5.6% – 8.2%	Concentration of IgA, Cortisol and Testosterone (nmol·L-1), T/C ratio.	CV = 3.7%, 3.1% and 4.1% for IgA, Cortisol and Testosterone, respectively
2016 Moalla et al. [59]	Observational prospective cohort (112 days)	1st division of the Country (n = 14; males; 26 ± 3 y; Qatar)	RPE (Scale 1-10 by Foster et al., 2001)	session-RPE (AU)	Not reported
			Psychometric Questionnaire	Sleep Quality, Fatigue, Stress, Muscle	Not reported

			with 7-point Likert scale (Hooper et al., 1995).	soreness levels and Hooper Index	
2016 Owen et al. [60]	Observational prospective cohort (4 days)	1st division (n = 10; males; 27 ± 4 y; Europe)	Salivary Imunoglobulina A (IPRO Interactive, not reported); not found.	sIgA (µg/mL)	
			Heart Rate Monitoring (Polar, Polar team2 Pro); not found.	HR response	Not reported
			RPE (Scale 6-20 by Borg, 1982)	Borg RPE scores	Not reported
				Sleep, Energy, Lower-body soreness, Readiness to training, Hooper Index.	Not reported
			Psychometric Questionnaire with 5-point Likert scale (Hooper et al., 1995).	Total distance (m), total high-intensity distance (> 21.6 km/h), frequency of efforts at high intensity (> 21.6 km/h), HI distance covered as a percentage of the TD covered within the training session, and, Meterage per minute, taken as an average of the TD covered within the session divided by session duration	Not reported
			EPTS (Catapult, MinimaxX); Accuracy = 1% – 2% over 20m sprints (reported as SEE and Bias).		Not reported
2016 Rago et al. [61]	Observational prospective cohort (210 days)	2nd division of the Country (n = 23; males; 24 ± 3 y; Italy)	Oxidative stress (not reported); not found.	Reactive oxygen species (µmol/L).	Not reported
2016 Romagnoli et al. [62]	Observational cross-sectional (1 day)	1st division of the Country (n = 20; males; 17-20 y; Italy)	Video-computerized system (Wisport, not reported); not found.	Total distance (m), Low-intensity running distance (< 15.0 km/h), High-intensity running distance (15.0 km/h – 20.0 km/h), Very high-intensity running (> 20.0 km/h).	Not reported
			Heart Rate Monitoring (Polar, Polar team2 Pro); not found.		Not reported
				avHR%max, Average HR, Peak HR, Peak HR%max, time above 90% HRmax	Not reported
			Blood samples (Sysmex, Sysmex XE-2100L and Siemens Healthcare Diagnostics, ADVIA 1800 and Roche Diagnostics, Elecsys 1010 and Human IL-6	blood cell count, hemoglobin, hematocrit, CK, high-sensitivity C-	Not reported

			Quantikine HS, ELISA kit); Accuracy: Sysmex XE-2100L was not found; Siemens ADVIA 1800 reported as Assay Methodology 2-point rate; Roche Elecsys 1010 reported as CV <1% at 50μL; Human IL-6 Quantikine HS as Intra-assay CV = 2.1% and Inter-assay CV = 2.4%. .	Reactive protein, Cortisol, testosterone, HsIL-6 Lower-limb muscle pain Jump height (calculated using the impulse method; cm), peak power output (PPO) and peak force (PF) for absolute and relative values.	
			Visual Analogue Scale Questionnaire (Chaffee et al., 2011) Countermovement Jump Test (Kistler, Force Platform Quattro Jump); not found.		
2017 Bacon and Mauger [63]	Observational prospective cohort (560 days)	1st division of the Country for youth players (n = 41; males; 19 ± 1 y; England)	EPTS (StatSports, Viper Pod); not found.	Total distance (m), high-speed running distance (> 75% of the individual player's maximum speed by test or GPS game data).	Not reported
2017 Barrett [64]	Observational prospective cohort (21 days)	1st division of the Country (n = 29; males; not reported; England)	EPTS (Catapult, S5 Optimeye, 10 Hz); Accuracy = 50 cm	Total distance covered (TDC), total high-speed running distance covered (> 19.8 Km/h; HSR), total sprinting distance covered (> 25.2 Km/h; SP) and a players maximum velocity (km/h; VEL), PlayerLoad (AU; PL).	SEM (TDC) = 16.2 m or 0.3%; SEM (HSR) = 4.3 m or 6.8%; SEM (SP) = 6.8 m or 9.7%; SEM (VEL) = 0.72 Km/h or 2.6%; SEM (PL) = 3.0 AU or 0.6%
2017 Clemente et al. [65]	Observational prospective cohort (300 days)	1st division of the Country (n = 35; males; 26 ± 5 y; Portugal)	RPE (Scale 1-10 by Foster et al., 2001) Psychometric Questionnaire	session-RPE (AU) Sleep Quality, Fatigue, Stress, Muscle soreness levels and Hooper Index	Not reported Not reported

			with 7-point Likert scale (Hooper et al., 1995).		
2017 Los Arcos et al. [66]	Observational prospective cohort (224 days)	1st division of the Country (n = 20; males; 21 ± 2 y; Spain)	RPE (Scale 1-10 by Foster et al., 2001) Countermovement Jump Test (Contact mat Newtest, not reported); not found. Sprint Test (Photocell gates Newtest, not reported); not found. Blood Lactate Concentration (ArkRay Inc Ltd, Lactate Pro LT-1710TM); Accuracy: CV = 3%.	Respiratory session-RPE (AU), Muscular session-RPE (AU). Jump height (cm): CMJ and CMJ with arm swing. Sprinting test of 15 m (split times were recorded at 5 m and 15 m). Velocity at 3 mmol.L^{-1}, blood lactate accumulation at 12 km/h and 13 km/h.	Not reported Not reported Not reported Not reported
2017 Mara et al. [67]	Observational prospective cohort (7 days)	1st division of the Country (n = 12; females; 24 ± 4 y; Australia)	Video-computerized system (Canon, Legria HF R38); not found.	Total distance (m), high-speed running distance (12.2 – 19.1 Km/h), and sprint distance (> 19.4 Km/h), distance of each individual run (< 10 m, 10–20 m, 20–30 m, > 30 m).	Not reported
2017 Muñoz-Lopez et al. [68]	Observational prospective cohort (660 days)	1st division of the Country (n = 18; males; 26 ± 3 y; Latvian)	Integrative tool of training load assessment (Soccer specific training load monitoring scale; Lopez et al., 2017). Heart Rate Monitoring (Garmin, Garmin HRM); not found. EPTS (Realtrack Systems, WIMU); Accuracy reported as precision locator <10cm.	TOM-scale Percentage of maximum heart rate (%HRmax), TRIMP (Banister, 1991), TRIMP (Edwards, 1994). Total distance, Peak speed, Average speed, % of high intensity actions (% HIA; > 14.4 km/h), total number of accelerations (> 0.55 m/s^2) and decelerations (> -0.55 m/s^2), total SPRINTS (> 21 km/h; number) and total impacts number (5G).	Not reported Not reported Not reported.

2017 Owen et al. [69]	Observational prospective cohort (140 days)	1st division of the Country (n = 29; males; 27 ± 4 y; Swiss)	EPTS (STATSports, Viper, 10 Hz); not found.	TDC, HSR (19.8–25.2 km /h), sprint distance (SpD: > 25.2 km/h) and the sum of high intensity efforts which is the total number of high accelerations and decelerations (SumA:D > 14.4 Km/h)	Not reported
2017 Owen et al. [70]	Observational prospective cohort (42 days)	1st division of the Country (n = 16; males; 27 ± 4 y; Europe)	EPTS (Catapult, not reported, 10 Hz); not found.	Stationary/walking (0–7.2 km/h), low intensity running (7.3–14.3 km/h), moderate intensity running (14.4–21.5 km/h), high-intensity running (21.6 – 25.2 km/h) and very high-intensity running (> 25.2 km/h), total distance covered (TDC), metres per min (distance covered per minute of play) (m/min), maximum speed reached (Vmax), and number of high-speed efforts (number of running efforts reaching speeds >21.6 km/h).	Not reported
					Not reported
			RPE (Scale 1-10 by Foster et al., 2001)	session-RPE (AU)	
2017 Rowell et al. [71]	Observational prospective cohort (not reported)	1st division of the Country (n = 18; males; 23 ± 4 y; Australia)	Countermovement Jump Test (Fitness Technology, 400 Series Platform Plate); not found. Salivary Cortisol and Testosterone (Salimetric, not reported and Molecular Devices, SpectraMax 190); Wavelength accuracy < ±2.0 nm; Wavelength repeatability ± 0.2 nm; Photometric accuracy < ±0.006 OD ±1.0%, 0–2.0 OD; Photometric precision < ±0.003 OD ±1.0%, 0–2.0 OD EPTS (Not reported); not found.	Jump height (m), peak velocity (m/s), relative peak and mean power (W/kg), relative peak force (N/kg), contraction time (s), and FT:CT ratio were analyzed. Concentration of cortisol (μg/dL) and testosterone (pg/mL), T/C ratio. PlayerLoad expressed in arbitrary units (au) accounted for match load; low load (0–499 au), medium load (500–1000 au), and high load (> 1000 au).	Not reported Not reported Not reported

2018 Abbott et al. [72]	Observational prospective cohort (34 days)	1st division of the Country for youth players (n = 19; males; 18 ± 1 y; England)	EPTS (Catapult, OptimEye S5B, 10 Hz); Accuracy: 50cm	High-speed running (15.1 km/h – 19.8 km/h), very high-speed running (19.8 km/h – 25.2 km/h), sprinting (> 25.2 km/h).	Not reported
2018 Al Haddad et al. [73]	Observational prospective cohort (404 days)	1st division of the Country (n = 19; males; 27 ± 3 y; Europe)	EPTS (GPSports, SPI Pro X, 5Hz); not found.	Total distance (TD; m), distance covered between 13-18 km/h (D13-18; m), distance covered between 18-21 km/h (D18-21; m), distance covered > 21 km/h (D>21; m), Accelerations between 2.5-4 m/s² (#Acc2.5-4), Accelerations > 4 m/s² (#Acc>4), Efforts > 21 km/h, Peak Speed (km/h)	SEM (TD) = 5.2% – 5.3%, SEM (D13-18) = 13.3% – 17.4%, SEM (D18-21) = 21% – 22.5%, SEM (D>21) = 42.9% – 53%, SEM (#Acc2.5-4) = 16.3% – 18.1%, SEM (#Acc>4) = 76.8% – 89.7%, SEM (Efforts > 21) = 44.5% – 49%, SEM (Peak Speed) = 6.0% – 7.7%
2018 Barret et al. [74]	Observational prospective cohort (281 days)	1st division of the Country (n = 32; males; 25 ± 8 y; England)	RPE (Scale 0-100 by Fanchini et al., 2016)	Respiratory session-RPE (AU; breathlessness), Muscular session-RPE (AU; leg muscle exertion), Technical session-RPE (AU; technical exertion).	Not reported
2018 Bendala et al. [75]	Observational prospective cohort (80 days)	1st division of the Country (n = 22; males; 27 ± 4 y; Spain)	EPTS (GPSports, SPI Elite Model, 1Hz); not found.	Number of high-velocity actions (> 23 km/h), Maximal velocity obtained both in competition matches and taining sessions, Distance covered at SP+ both in competition matches and taining sessions (> 23 km/h).	Not reported
2018 Fitzpatrick et al. [76]	Observational prospective cohort (42 days)	1st division of the Country for youth players (n = 14; males; 17 ± 1 y; England)	EPTS (Catapult, MinimaxX S4, 10 Hz); not found. Anaerobic speed reserve; Sprint Testing + 1500-metre time Trial (Draper, Brower	High Speed Running Time (t>HSD) and Distance (m>HSD) at 17-21 km/h, Very High Speed Running Time (t>VHSD) and Distance (m>VHSD) at > 21 km/h.	MDC (t>HSD) = 123% – 141%; MDC (m>HSD) = 141% – 146%; MDC (t>VHSD) = 160% – 305%; MDC (m>VHSD) = 48% – 168%.

Study	Design	Population	Measurement tools	Variables	Results
			Timing Systems).		MDC (t>MAS) = 112% – 174%; MDC (m>MAS) = 116% – 144%; MDC (t>30ASR) = 7% – 116%; MDC (m>30ASR) = 73% – 145%.
			Heart Rate Monitoring (Polar, Polar t34); not found.	Metres covered and time spent at Maximal aerobic speed (MAS; m>MAS, t>MAS) and 30% anaerobic speed reserve (ASR; m > 30ASR, t > 30ASR).	
			RPE (Scale 1-10 by Foster et al., 2001).	TRIMP (Edwards, 1994).	Not reported
				session-RPE (AU) and Foster RPE scores.	Not reported
2018 Gomez et al. [77]	Observational prospective cohort (21 days)	1st division of the Country (n = 25; males; 21 ± 2 y; Spain)	EPTS (STATSports Viper, 10Hz); not found.	distance covered per minute (DC; m/min), high speed running (HSR; > 19.8 km/h; m/min), sprinting (SPR; > 25.2 km/h; m/min); the number of intense accelerations (ACC; >3 m/s^2, n/min); the number of intense decelerations (DEC; <–3 m/s^2, n/min); mean metabolic power (MP; W/kg), and high metabolic load distance (HMLD; >25.5 W/kg; m/min).	Not reported
2018 Jaspers et al. [78]	Observational prospective cohort (730 days)	1st division of the Country (n = 38; males; 23 ± 3 y; Netherlandsl)	RPE (Scale 1-10 by Foster et al., 2001)

EPTS (Catapult, OptimEye S5, 10Hz); Accuracy: 50cm | session-RPE (AU)

Duration, total distance covered, distances covered in different speed zones, and percentages of distances covered at different speeds. The different speed zones considered are 0–1 km/h, 1–7 km/h, 7–12 km/h, 12–15 km/h, 15–20 km/h, 20–25 km/h, and >25 km/h, speed (distance covered per minute and the number of efforts in the different speed zones), Acceleration and deceleration (accelerating and decelerating efforts and distance are divided into different zones based on magnitude: 0–1 m/s^2, 1–2 m/s^2, 2–3.5 m/s^2, and >3.5 m/s^2, PlayerLoad, | Not reported

Not reported |

				PlayerLoad 3D, PlayerLoad per meter (ie, PlayerLoad 3D per total distance covered) and the PlayerLoad per minute are included. Furthermore, it includes PlayerLoad 1D (ie, PlayerLoad values per axis). Repeated high intensity effort activity (3 or more sprints, high-magnitude accelerations, or a combination of both within 21 seconds). This category included measures based on RHIE, such as RHIE bout recovery, RHIE duration, RHIE per bout, and RHIE total bouts.	
2018 Jaspers et al. [79]	Observational prospective cohort (730 days)	1st division of the Country (n = 35; males; 23 ± 4 y; Netherlands)	RPE (Scale 1-10 by Foster et al., 2001)	session-RPE (AU), ACWR with session-RPE and Foster RPE scores.	Not reported
			EPTS (Catapult, Minimax S4 and OptimEye S5, 10Hz); Catapult Minimax S4 Accuracy was not found and Catapult OptimEye S5 Accuracy: 50cm.	Total Distance Covered, Distance Covered at high speed (> 20 km/h), number of acceleration (> 1 m/s^2), deceleration (> -1 m/s^2) efforts, and ACWR for all of them.	Not reported
2018 Lacome et al. [80]	Observational prospective cohort (281 days)	1st division of the Country (n = 10; males; 26 ± 5 y; France)	Heart Rate Monitoring (Polar, Polar H1); not found	Mean percentage of maximum HR (% HR$_{max}$)	Not reported
			EPTS (GPSport, SPE-Pro, Team MAS R1 2016.8, 5Hz); GPS Variable Distance Accuracy was reported by error of <2%. Variable Speed Zone Distance Accuracy was reported at <1% error.	Total distance (TD, m), high-speed distance (HS, distance above 14.4 km.h-1, m), very-high speed distance (VHS, distance above 19.8 km.h-1, m), velocity (sum of distance covered weighted by the speed of displacement; AU) and force load (sum of estimated ground reaction forces during all foot impacts; AU) and mechanical work (overall measure of velocity changes and is computed using > 2 m/s^2 accelerations, decelerations and changes of direction events; AU).	Not reported
2018 Malone et al. [81]	Observational	1st division of the	Countermovement Jump Test	Jump height (cm)	Not reported

	prospective cohort (281 days)	Country (n = 30; males; 25 ± 3 y; Portugal)	(Microgate, Optogait); Accuracy: 1ms	CK absolute concentration (μ·L-1)	SEM = 2.3%
			CK (Roche, Reflotron); Accuracy: CV = 3.1% EPTS (STATSports, Viper, 10Hz); not found.	Total Distance Covered, High-Speed Running Distance Covered (> 14.4 km/h), Very High-Speed Running Distance (> 19.8 km/h), Total Distance Covered per minute, High-Speed Running Distance Covered per minute (> 14.4 km/h), Very High-Speed Running Distance per minute (> 19.8 km/h), number of acceleration (> 3 m/s^2), number of deceleration (> -3 m/s^2), High Metabolic Power Distance (> 25.5 W/kg), High Metabolic Power Distance per minute (> 25.5 W/kg), Dynamic Stress Load (total of the weighted impacts), and Maximal Velocity .	Not reported
2018 Malone et al. [82]	Observational prospective cohort (301 days)	1st division of the Country (n = 1; male; 21 y; Netherlands)	Psychometric Questionnaire with 5-point Likert scale (Hooper et al., 1995). RPE (Scale 1-10 by Foster et al., 2001) EPTS (Catapult, OptimEye G5); not found.	Sleep Quality, Fatigue, Stress, Muscle soreness levels, Mood and Hooper Index session-RPE (AU) Duration, Total Distance, Average speed, High acceleration effort, High deceleration effort, PlayerLoad, PlayerLoad per minute .	Not reported CV = 49% CV (duration) = 35%; CV (total distance) = 43%; CV (Average speed) = 16%; CV (High acceleration effort) = 68%; CV (High deceleration effort) = 70%; CV (PlayerLoad) = 37%; CV (PlayerLoad per minute) = 20% .
2018 Malone et al. [83]	Observational prospective cohort (281 days)	1st division of the Country (n = 48; males; 25 ± 3 y; Portugal)	Psychometric Questionnaire with 7-point Likert scale (Hooper et al., 1995). RPE (Scale 1-10 by Foster et	Sleep Quality, Fatigue, Stress, Muscle soreness levels, and Energy level. session-RPE (AU). Integrated training load ratios were also analysed for total	Not reported Not reported Not reported

				distance:RPE, total high speed distance:RPE player load:RPE and player load slow:RPE, respectively	Not reported
al., 2001)			Sprint Test (Photocell gates Microgate, Witty); Accuracy: ±0.4 ms	Times at 0-, 10-, 20-, 30-and 40-m	
			EPTS (Catapult, MinimaxX, Team 2.5,); not found.	Total distance (m); total high-speed distance (≥19.8–25.2 km/h) sprint distance (≥25.2 km/h), maximal velocity (km/h), maximal velocity distance (m), maximal velocity exposures (n), player load (AU) and player load slow (AU) .	
2018 McCall et al. [84]	Observational prospective cohort (118 days)	National Team (n = 20; males; 26 ± 4 y; Australia)	RPE (Scale 1-10 by Foster et al., 2001)	session-RPE (AU), ACWR, Chronic Load during pre camp, Match Load 4 weeks prior to TC, Week 1 training camp load	Not reported
			Training Planning	External Load (number of sessions), Chronic number of sessions, Number of matches played 4 weeks prior to TC, Week 1 training camp number of sessions, ACWR with number of sessions)	Not reported
2018 Osorio et al. [85]	Observational retrospective cohort (140 days)	1st division of the Country (n = 20; males; 25 ± 4 y; Colombia)	Integrative tool of training load assessment (Scale 1-5 by Osorio et al., 2018)	Weekly training load	Not reported
			Blood samples (Erba Mannheim, ERBA Chem 7 analyzer); not found	CPK (μmol/L) and urea (mg/dL) concentrations	Not reported
2018 Owen et al. [86]	Observational prospective cohort (562 days)	National Team (n = 20; males; 25 ± 4 y; European Team)	RPE (Scale 1-10 by Foster et al., 2001)	session-RPE (AU)	Not reported
			Psychometric Questionnaire with 10-point Likert scale (Hooper et al., 1995).	Energy levels, Quality of Sleep, Readiness to train, and Lower Body Soreness, Hooper Index	CV (Total Wellness) = 15.0%), CV (Energy) = 14.0%, CV (Readiness) = 17.0%, CV (Sleep) = 20.0%,
				s-IgA (μg.min-1)	

Study	Design	Sample	Instruments	Variables	Reliability
			Salivary Imunoglobulina A (IPRO Interactive, not reported); not found.		and CV (Lower Body Soreness) = 20.0% CV = 91.0%
					Not reported Not reported
2018 Rowell et al. [87]	Observational prospective cohort (210 days)	1st division of the Country (n = 21; males; 25 ± 6 y; Australia)	RPE (Scale 1-10 by Foster et al., 2001) Countermovement Jump Test (Fitness Technology, 400 Series Platform Plate); not found. EPTS (Catapult, Optimeye S5); Accuracy: 50 cm	session-RPE (AU) flight time:contraction time (FT:CT) Distance, High-intensity running distance, PlayerLoad per minute, PlayerLoad meter per minute, PlayerLoad Slow per minute, Meter per minute, PlayerLoad 2D per minute, individual PlayerLoad vectors	SEM values from the reliability analysis of the SSG were: m/min = 4.2%, HIR/min = 30.6%, PlayerLoad/min = 4.5%, PlayerLoad•m/min = 2.8%, PlayerLoad•2D/min = 4.6%, PlayerLoad•Slow/min = 8.9%, PlayerLoad AP = 3.9%, PlayerLoad ML = 2.4%, PlayerLoad V = 2.1%. These variables were considered reliable and were used for subsequent analysis, however, due to a poor SEM of 30.6% (Duthie et al., 2003; Jennings et al., 2010), HIR/min was excluded from further analysis.
2018 Rowell et al. [88]	Observational prospective cohort (210 days)	1st division of the Country (n = 23; males; 23 ± 4 y; Australia)	RPE (Scale 1-10 by Foster et al., 2001) Countermovement Jump Test (Fitness Technology, 400 Series Platform Plate); not found. Coach rating of performance (Cormack et al., 2008b; McLean et al., 2010). Salivary Cortisol and	session-RPE (AU), Smoothed internal load (exponentially weighted moving average; EWMA) Flight time:contraction time (FT:CT) A Likert scale (1 = poor through to 5 = excellent) was used to rate each players' performance in fulfilling their assigned role throughout the match Testosterone [pg..mL^{-1}] and Cortisol [mg..dL^{-1}] concentration	Not reported Not reported Not reported Not reported

			Testosterone (Salimetric, not reported and Molecular Devices, SpectraMax 190); accuracy $< \pm 2.0$ nm; Photometric accuracy $< \pm 1.0\%$		
2018 Selmi et al. [89]	Experimental pre-post (28 days)	1st division of the Country (n = 22; males; 25 ± 1 y; Tunisia)	Psychometric Questionnaire with 7-point Likert scale (Hooper et al., 1995)	Perceived fatigue, sleep, soreness, stress, and Hooper index	Not reported
			Physical Activity Enjoyment Scale (Kendzierski & DeCarlo, 1991)	Enjoyment level	Not reported
			RPE (Scale 1-10 by Borg, 1982)	Borg RPE scores	
			TQR scale (Kentta & Hassmen, 1998)	Recovery level	Not reported
2018 Silva et al. [90]	Observational prospective cohort (45 days)	1st division of the Country (n = 20; males; 27 ± 4 y; Russia)	EPTS (STATSports, Viper, 10 Hz); not found.	Accelerations > 2 m/s² (n) and (n/min), Accelerations > 2.5 m/s² (n) and (n/min), Accelerations > 3 m/s2 (n) and (n/min), Decelerations > 2 m/s2 (n) and (n/min), Decelerations > 2.5 m/s2 (n) and (n/min), Decelerations > 3 m/s2 (n) and (n/min), Total distance (m) and Distance per minute (m/min), Distance > 14.4 Km/h (m) and per minute (m/min), Distance 14.4 – 19.8 Km/h (m) and per minute (m/min), Distance > 19.8 Km/h (m) and per minute (m/min), Impacts (n) and per minute (n/min), Dynamic stress load (AU) and per minute (AU/min), Total loading (total of the forces; AU) and per minute (AU/min), High intensity bursts (number of accelerations > 2.5 m/s²; n) and per minute (n/min), High metabolic load distance (> 14.4 Km/h;	Not reported
			Heart Rate Monitoring (Polar, not reported); not found.		

				m) and per minute (m/min).	Not reported
				Banister's TRIMP (Banister, 1991), Edwards' training load (Edwards, 1993), tHR70, tHR80, tHR85, %tHR70, %tHR80, %tHR85, avHR%$_{max}$, Heart rate exertion (Statsports, 2012).	
2018 Tang et al. [91]	Experimental crossover randomized controlled (14 days)	1st division of the Country (n = 13; males; 18 ± 1 y; England)	EPTS (STATSports, Viper, 10 Hz); not found	g-force (raw data of each impact in the vertical, medial-lateral, and anterior-posterior plane), high intensity running distance (> 21.6 km/h).	Not reported
			Heart Rate Monitoring (Polar, Polar T31); Accuracy: 1bpm and ± 0,5s		Not reported
			RPE (Scale 1-10 by Foster et al., 2001).	Heart rate exertion (Statsports, 2012).	Not reported
				Foster RPE scores	
2018 Vigh-Larsen et al. [92]	Observational prospective cohort (90 days)	1st division of the Country (n = 14; males; 27 ± 1 y; Denmark)	EPTS (Chyronhego, Systems, ZXY tracking system, 20 Hz); Accuracy as vector noise error: < ± 0,05 degr.	High-intensity running (from 19.8 to 25.2 km/h; m), Spriting (> 25.2 km/h; m), Acceleration (> 1ms² and > 2ms²), Decelerations (>-1ms² and > -2ms²), Total distance .	Not reported
2019 Abbott et al. [93]	Observational prospective cohort (259 days)	2nd division of the Country (n = 25; males; 20 ± 1 y; England)	EPTS (Catapult, OptimEye S5B, 10 Hz integrated with a accelerometer of 100-Hz); not found.	Weekly training distance (m), Weekly training high speed running distance (≥ 60% of maximum speed; m), Weekly training duration (minutes).	Not reported
			Edinburgh Mental Well-being Scale (WEMWBS; Stewart-Brown, 2009)	Weekly WEWMBS scores:14-70	Not reported
			Watch (not reported); not found.	Time out with injury (%)	Not reported

2019 Clemente et al. [94]	Observational prospective cohort (35 days)	1st division of the Countries (n = 89; males; 24 ± 3 y; Netherlands and Portugal)	EPTS (JOHAN, not reported, 10 Hz); not found.	Total distance (m), walking distance (0–6.9 km/h; m), jogging distance (7.0–13, km/h; m), running distance (14.0–20.0 km/h; m), sprint distance (> 20.0 km/h; m), maximum speed (km/h; km/h), number of sprints per minute ((> 20.0 km/h; n/min) and pace (m/min), player load (g).	Not reported
			Watch (not reported); not found	Trained/played minutes	Not reported
2019 Clemente et al. [95]	Observational prospective cohort (281 days)	1st division of the Countries (n = 27; males; 25 ± 4 y; Portugal)	EPTS (JOHAN, not reported, 10 Hz); not found.	Total distance (m), running distance (14.0–19.9 km/h; m), high-speed running (20.0–24.9 km/h; m); sprinting distance (> 25.0 km/h; m), player load (g), total high accelerations (> 3 m/s2); total high decelerations (> 3 m/s2), TMr = weekly load/match demands.	Not reported
			Watch (not reported); not found	Trained/played minutes	Not reported
2019 Constantine et al. [96]	Observational prospective cohort (270 days)	1st division of the Country for youth players (n = 14; males; 17 ± 1 y; England)	Isometric Force testing (Pasco, PS-2141, a single vertical axis force platform at a sampling frequency of 1000 Hz); not found.	Total peak force (mean peak force across trials) relative to body weight (N/kg). Posterior Chain at 30° and 90°	CV = 7.5% (average CV within the sessions)
2019 Coppalle et al. [97]	Observational prospective cohort (84 days)	2nd division of the Country (n = 14; males; 26 ± 5 y; France)	EPTS (GPSports, not reported, 15 Hz); not found.	Total distance covered, <12 km/h, 12–16 km/h, 16–20 km/h, 20–25 km/h, and >25 km.	Not reported
			RPE (Scale 6-20 by Borg, 1982).	session-RPE (AU).	Not reported
			Blood samples (Thermo		

			Electron Corporation, Konelab 30TM); Accuracy: Intra-assay CV = 0.4-1.4% Inter-assay CV = 0.3-0.5%	Plasma CK, CRP, and LDH	CV = 1.8%, 1.7%, 1.1%, respectively.
2019 Cortê et al. [98]	Observational prospective cohort (648 days)	1st division of the Country (n = 28; males; 27 ± 4 y; Brazil)	Infrared thermography (FLIR, T450sc). Accuracy = ± 2°	Region of interest (ROI).	Not reported
2019 Costa et al. [99]	Observational prospective cohort (9 days)	National Team (n = 20; females; 25 ± 3 y; Portugal)	EPTS (STATSports, Apex, 18 Hz); not found.	Total distance covered (TD), High-speed running (> 12.6 km/h), training and match exposure time (minutes).	Not reported
			RPE (Scale 1-10 by Foster et al., 2001).	session-RPE (AU)	Not reported
			Actigraphy (Actigraph LLC wGT3X-BT); not found.	Total sleep time, time in bed, wake-up time, sleep onset time, wake after sleep onset, sleep fragmentation index, latency, and sleep efficiency.	CV (Total sleep time) = 10.0%
			Heart Rate Monitoring (Firstbeat, Firstbeat Bodyguard2); Accuracy = 1ms	Mean HR, RMSSD, lnRMSSD, SDNN, SD1, SD2, LF/HF, ln.	CV (lnRMSSD) = 6.0%
2019 Figueiredo et al. [100]	Observational prospective cohort (4 days)	National Team (n = 18; males; 22 ± 2 y; Portugal)	EPTS (STATSports, Viper Pod, 10 Hz); not found.	Total training time (minutes), total distance covered, distance covered per min, high-speed distance (>14.4 km/h), sprints (>19.8 km/h), number of accelerations (no descriptions), number of decelerations (no descriptions), dynamic stress load (total of weighted impacts) and total load (total of accelerometer-derived forces applied on the player without any weightings).	Not reported
			RPE (not reported).	session-RPE (AU).	Not reported
			Salivary Imunoglobulina A (IPRO Interactive, not reported); not found.	sIgA (µg/mL)	Not reported
2019 Geurkink et al. [101]	Observational prospective cohort	1st division of the Country (n = 13; males;	Heart Rate Monitoring (Polar, Polar Team Pro, 20-Hz	Edwards' training impulse (TRIMP) (Edwards, 1994).	Not reported

	(630 days)	18 ± 1 y; Belgium)	integrated with GPS); not found.		
			EPTS (Polar, Polar Team Pro, 10 Hz); not found.	Total distance (m), training duration (seconds), distance (m) in 5 speed zones (3.00– 6.99 km/h, 7.00–10.99 km/h, 11.00–14.99 km/h, 15.00–18.99 km/h, and >19.00 km/h), the number of accelerations (m/s2) (0.50–0.99, 1.00–1.99, 2.00–2.99, and 3.00–50.00), the number of decelerations (m/s2) (0.50–0.99, 1.00–1.99, 2.00–2.99, and 3.00–50.00), and the number of sprints (>25 km/h). Average speed (m/s) was derived using distance and time.	Not reported
			RPE (Scale 1-10 by Foster et al., 2001).	session-RPE (AU)	Not reported
2020 Grunbichler et al. [102]	Observational prospective cohort (91 days)	2nd division of the Country (n = 14; males; 23 ± 4 y; Austrian)	Heart Rate Monitoring (Polar, Polar Team Pro, 20-Hz integrated with GPS); not found.	TRIMP (Stagno et al., 2007) and Polar Training Load.	Not reported
			EPTS (Polar, Polar Team Pro); not found.	Workload efficiency (ED/TRIMP), Duration (minutes), Distance > 25.2 km/h, Distance > 19.8 - 25.2 km/h, High speed running (> 14.4 km/h – 19.8 km/h; m), Number of medium and high accelerations (2.00 - 2.99 m/s²; n, and >3.00 m/s²; n), Number of medium and high decelerations (-2.00 a- 2.99 m/s²; n, and > -3.00 m/s²; n), Equivalent Distance (ED; Osgnach et al., 2010; Di Prampero et al., 2015).	Not reported
2019 Haller et al. [103]	Observational prospective cohort (120 days)	The division of the Country was not reported (n = 22; males; 24 ± 3 y; German)	Blood samples (Bio-Rad, CFX384 Touch™ Real-Time PCR system); Accuracy: ± 0.2ºC	cell-free DNA (cfDNA)	Not reported
				distance covered (m), number of	

			EPTS (Catapult, OPTA System); not found.	sprints (>23 km/h; n) and number of intense runs (>18 km/h; n) for games and distance covered, accelerations and decelerations and Catapult load for training.	Not reported
			Visual Analogue Scale Questionnaire (VAS; Crichton, 2001)		
				"general perceived exertion", "muscular fatigue", "sleep quality", "time of sleep" and "mental fatigue", session-RPE (AU) (Lines were 10 cm in total)	Not reported
2019 Izzo et al. [104]	Observational prospective cohort (24 days)	1st division of the Country (n = 3; males; 20 ± 2 y; Italy)	EPTS (Goalkeeper Tracker, IMU K-SPORT UNI.STATS, KTrack); not found.	Training Load, Average Strength, Lateral Imbalance, Number of Vertical Jumps, Vertical jump accelerations (intensity), Number of dives to the right (volume), Right dive accelerations (intensity), Number of dives to the left (volume), Left dive accelerations (intensity).	Not reported
2019 Op De Beéck et al. [105]	Observational prospective cohort (282 days)	1st division of the Country (n = 26; males; 23 ± 4 y; Netherlands)	EPTS (Catapult, Optimeye S5); Accuracy: 50cm. RPE (Scale 1-10 by Foster et al., 2001). Psychometric Questionnaire with 5-point Likert scale (Hooper et al., 1995) .	Training Duration (minutes), Match Duration (minutes), Total Distance (m), PlayerLoad (AU), Ditance at high intensity (≥ 20 km/h), Accelerations > $1m/s^2$ (nº), Decelerations < $-1m/s^2$ (nº). session-RPE (AU) Fatigue, Sleep Quality, General Muscle Soreness, Stress Levels, Mood.	Not reported Not reported Not reported
2019 Jatene et al. [106]	Observational prospective cohort (70 days)	1st division of the Country (n = 28; males; not reported; Brazil)	RPE (Scale 1-10 by Foster et al., 2001).	Foster RPE scores.	Not reported
2019 Lee and Mukherjee [107]	Observational prospective cohort (42 days)	1st division of the Country (n = 29; males; 26 ± 4 y; Singapore)	EPTS (Catapult, Minimax X3, 5 Hz); not found.	Total Distance (m), Work Rate (m/min), PlayerLoad (AU), Distance at low intensity (≤ ventilatory threshold	Not reported

Study	Design	Population	Instruments	Variables	Reliability
			Heart Rate Monitoring (Polar, Polar System 2); not found.	1), Distance at moderate intensity (between ventilatory threshold 1 and ventilatory threshold 2), Distance at hight intensity (≥ ventilatory threshold 2).	Not reported
					Not reported
					Not reported
			RPE (Scale 1-10 by Foster et al., 2001).	TRIMP (Lucia et al., 2000), Summated Heart Rate Zone (Lucia et al., 2000)	Not reported
			Maximal running test (Yo-Yo Intermittent Endurance Level 2, Bangsbo et al., 2006)	session-RPE (AU)	
				Distance Covered	
			Repeated Sprint Ability (not reported); not found.	Total Sprint Time, Mean Sprint Time, 10-m and 20-m Sprint Time.	
2019 Morales et al. [108]	Observational prospective cohort (not reported)	1st division of the Country (n = 16; females; 23 ± 5 y; Spain)	RPE (Scale 1-10 by Foster et al., 2001).	session-RPE (AU), Monotony, Strain.	
			Heart Rate Monitoring (Polar, Polar RS810); Accuracy: ± 1bpm	Mean RR (ms), STDRR (ms), Mean HR (1/min), RMSSD (ms), LF (u.n.), HF (u.n.), LF/HF, Edwards TL (Edwards, 1993).	Not reported
			RESTQ-Sport Scale (Kellmann and Kallus, 2001).		Not reported
			Maximal running test (Cooper test , McArdle et al., 2010 and Yo-Yo Intermittent Recovery Level 1, Bangsbo et al., 2008)	General Stress, Sport-Specific Stress, General Recovery, Sport-Specific Recovery. Total Distance (m) for both. .	Not reported
					Not reported
2019 Moreno-Perez et al. [109]	Observational prospective cohort (6 days)	2nd division of the Country (n = 20; males; 28 ± 2 y; Spain)	EPTS (Goalkeeper Tracker, STATSports, Viper Pod 2); not found. .	Total distance covered (m), High metabolic load distance (distance covered when metabolic power showed a value > 25.5 W/kg; m), Total high metabolic load efforts (total count of events in which metabolic power showed a value above 25.5 W/kg with at least 1 s of duration; n), Total high intensity (> 3 m/s^2; n) accelerations and	Not reported

				Total high intensity (< -3 m/s^2) decelerations, the number of impacts (> 5G), Dynamic stress load (total of the weighted impacts).	
2019 Noor et al. [110]	Observational retrospective cohort (125 days)	National Team (n = 35; males; 26 ± 4 y; Australian)	RPE (Scale 1-10 by Foster et al., 2001).	session-RPE (AU): Weekly Training Load (AU), Weekly Match Load (AU), Mean Weekly Total Load (AU), Mean RPE (Foster RPE scores: 1–10), ACWR (7:21 days).	Not reported
			Training Planning	Weekly Training Sessions (nº), Weekly Matches (nº)	Not reported.
2019 Rabbani et al. [111]	Observational prospective cohort (21 days)	1st division of the Country (n = 11; males; 27 ± 5 y; Iran)	Maximal running test (30-15 Intermittent Fitness Test, Buchheit, 2008).	Final velocity during the 30-15 IFT.	SEM = 1.4 – 1.5 Km/h (7.7% – 8.0%)
			EPTS (GPSports, SPI Pro X, 5 Hz); not found	Training Duration (minutes), Total Distance (m), High-intensity running performance (HIR; distance covered above 14.4 km/h1), Very high-intensity running performance (VHIR; distance covered above 19.8 km·h-1), New Body Load.	Not reported
		Heart Rate Monitoring (Polar, Polar T34); not found.			
		.		Edwards TRIMP (Edwards, 1993), Banister TRIMP (Morton et al., 1985), Z5 TRIMP, T90%HR.	Not reported
2019 Rabbani et al. [112]	Observational prospective cohort (12 days)	1st division of the Country (n = 9; males; 25 ± 4 y; Iran)	RPE (Scale 1-10 by Foster et al., 2001).		
			Heart Rate Monitoring (Polar, Polar H7); Accuracy= ± 1bpm	session-RPE (AU).	Not reported
				Ln RMSSD (ms).	SEM (%; 90%CI) = 7.6% (5.8% – 11.9%)
			Psychometric Questionnaire with 7-point Likert scale (Hooper et al., 1995)	Hooper Index	SEM (%; 90%CI) = 19.6% (14.8% – 31.9%)
				.	

2019 Rago et al. [113]	Observational prospective cohort (4 days)	2nd division of the Country (n = 14; males; 28 ± 3 y; Italy)	EPTS (GPSports, SPI Pro X, 5 Hz); not found.	Total distance covered (TDC), High-intensity running distance (HIR; > 16 km/h), Very high speed distance (VHS > 22 km/h), Total acceleration distance (T_acc), Maximum acceleration (Max_acc; > 3 m/s^2), Total deceleration distance (T_dec), Maximum deceleration (Max_dec; < -3 m/s^2).	CV (TDC) = 8.3 ± 0.5%, CV (HIR) = 25.2 ± 5.3%, CV (VHS) = 29.0 ± 9.5%, CV (T_acc) = 18.3 ± 2.5%, CV (Max_acc) = 43.3 ± 16.9%, CV (T_dec) = 15.9 ± 2.0%, CV (Max_dec) = 36.6 ± 11.8%.
2019 Rossi et al. [114]	Observational prospective cohort (195 days)	1st division of the Country (n = 22; males; 22 ± 5 y; Italy).	RPE (Scale 0-10 by Carrie, 2012). EPTS (Catapult, Playertek, 10 Hz); Accuracy: ± 18 G accelerometer.	Carrie RPE scores (Season), session-RPE (AU; Season), ACWR, Monotony (Week and Month), Strain (Week and Month), RPE PrevPlayer, RPE (match day). Total Distance (match day), Sprint Distance (match day), Top Speed (match day), Distance in Speed Zone 2 (match day), Accelerations Zone Count (2-3) (match day), Deceleration Zone Count (2-3) (match day), Acceleration Zone Count (>3) (match day), Distance in Power Zone (20-25 w/kg) (match day), Decelerations Zone Count (>3) (match day), Distance in Power Zone (> 20 w/kg) (match day), Power Score (w/kg) (match day), Distance per min (m/min) (match day).	CV (RPE Season) = 31%, CV (session-RPE Season) = 47%, CV = RPE (match day) = 19%, RPE PrevPlayer, ACWR (6:28 days), Monotony, Strain = not reported CV (Total Distance match day) = 22%, CV (Sprint Distance match day) = 44%, CV (Top Speed match day) = 10%, CV (Distance in Speed Zone 2 match day) = 27%, CV (Accelerations Zone Count 2-3 match day) = 30%, CV (Deceleration Zone Count 2-3 match day) = 31%, CV (Acceleration Zone Count >3) = 34%, CV (Distance in Power Zone 20-25 w/kg match day) = 32%, CV (Decelerations Zone Count >3 match day) = 32%, CV (Distance in Power Zone > 20 w/kg match day) = 30%, CV (Power Score w/kg match day) = 19%, CV (Distance per min m/min match day) = 19%.
2019 Sangnier et al. [115]	Observational retrospective cohort (65 days)	1st division of the Country (n = 25; males; 26 ± 5 y; France)	EPTS (K-Sport, K-Gps, 10 Hz); not found. ·	Total Distance (m), Estimated Energy Expenditure (kj/kg/min), Distance metabolic power (> 20 W/kg; m/min), Number metabolic power (> 20 W/kg; nº/min), Distance of Sprints (> 21	Not reported

				km/h; m/min), Number of Sprints (> 21 km/h; nº/min), Distance Accelerations (> 3 m/s^2; m/min), Number of Accelerations (> 3 m/s^2; nº/min), Distance Decelerations (> -3 m/s^2; m/min), Number of Decelerations (> -3 m/s^2; nº/min).	
2020 Bowen et al. [116]	Observational prospective cohort (61 days)	1st division of the Country (n = 33; males; 24 ± 3 y; England)	EPTS (StatSports, Viper 2) and Video-computerized system (ChyronHego, TRACAB); not found. .	Total Distance (m), Low intensity distance (Total distance covered below 14.4 km/h), High speed running distance (Total distance covered between 19.8 km/h and 25.2 km/h), Sprint Distance (m), Accelerations (> 0.5 m/s^2), Decelerations (> -0.5 m/s^2) and ACWR (7:28 days) for all.	Not reported
2020 Clemente et al. [117]	Observational prospective cohort (45 days)	1st division of the Country (n = 19; males; 27 ± 4 y; one of the "big five" leagues in Europe)	EPTS (STATSports, Apex, 18 Hz); not found. .	Total distance (TD), distances covered at 14 km/h or above (DC > 14 km/h), high-speed running above 19.8 km/h (HSR) distance, and number of sprints above 25.2 km/h were collected. Following the objectives of this study, the acute load (weekly), training monotony, and training strain calculations for each external load variable.	Not reported
2021 Enes et al. [118]	Observational prospective cohort (44 days)	1st division of the Country (n = 23; males; 27 ± 4 y; Brazil)	EPTS (Catapult, Optimeye S5); Accuracy: 50cm .	Player Load (arbitrary units), Player Load/min, (arbitrary units), Total Distance (m), Relative Distance (m/min), Distance >20 km/h (m), Number of stimuli >20 km/h (frequency) and Maximal speed (km/h).	Not reported
			RPE (Scale 1-10 by Foster et al., 2001).		Not reported
			Body Composition (Balance Filizola, PL-150; Adipometer Cescorf, Scientific Model); Accuracy = 50 g and 0.1 mm, respectively.	session-RPE (AU)	Not reported
				Height, body mass and body fat (Faulkner's equation for athletes)	Not reported
			Sit-and-reach test (Wells bench, not reported)		Not reported
				Flexibility (cm)	

			Maximal oxygen uptake (Treadmill Inbramed, Super ATL; Gas analyzer Metalyzer, Cortex 3B, Electrocardiogram Micromed, WinCardio); Treadmill Inbramed accuracy was not found. Gas analyzer Cortex 3B CO_2 and O_2 accuracy <0,1 Vol %; Volume Turbine, Reusable accuracy: 50ml or ±2%; Volume Turbine, Disposable accuracy: ±3%. Electrocardiogram Micromed, WinCardio accuracy: ±1%. Countermovement Jump Test (Fitness Technology, 400 Series Platform Plate); not found.	Peak of aerobic speed (km/h), VO_{2MAX} (ml.kg/min), Aerobic threshold (km/h), Anaerobic threshold (km/h) Jump height (cm)		
2020 Gonçalves et al. [119]	Observational prospective cohort (182 days)	2nd division of the Country (n = 23; males; 27 ± 4 y; Brazil)	EPTS (Catapult, Playertek, 10 Hz); Accuracy: ±18 G accelerometer. . RPE (Scale 1-10 by Foster et al., 2001).	Total distance covered (m), Total distance covered under low to moderate-intensity running (≤18 km/h), Total distance covered under high-intensity running (HIR, >18 km/h); Total distance covered under high-intensity acceleration (≥ 2 m/s²), Total distance covered under high-intensity deceleration (≤ -2 m/s²), Player Load session-RPE (AU)	Not reported Not reported	
2020 Granero-Gil et al. [120]	Observational prospective cohort (301 days)	1st division of the Country (n = 30; males; 27 ± 6 y; Russia)	EPTS (RealTrack Systems, WIMU PRO, 10 Hz); Accuracy reported as precision locator <10cm. Body Composition (Balance SECA, not reported; eight-	Centripetal force and Change of direction Height and body mass.	Not reported Not reported	

			electrode segmental body composition monitor TANITA, BC-601 model) Accuracy Weight: 0.1Kg; Accuracy Body fat: 0,1%.		
2020 Houtmeyers et al. [121]	Observational prospective cohort (282 days)	1st division of the Country (n = 11; males; 25 ± 3 y; Netherlands)	EPTS (Catapult, Playertek, 10 Hz); Accuracy: ±18 G accelerometer. .	Distance covered at 12-15, 15-20, 20-25, >25 kmh-1. To calculate external intensity, the distance values (m) were divided by the duration (min) as well as the monotony were calculated for all.	Not reported
2020 Ibáñez et al. [122]	Observational prospective cohort (46 days)	1st division of the Country (n = 27; females; 24 ± 5 y; Spain)	Heart Rate Monitoring (Suunto, Team Manager 2.1.2 and Team Monitor 2.1.1); not found. Integrative tool of training load assessment (Ibáñez et al., 2016)	%HRmax SIATE (Sistema Integral para el Análisis de las Tareas de Entrenamiento)	Not reported Not reported
2020 Lolli et al. [123]	Observational prospective cohort (1034 days)	1st division of the Country (n = 11; males; 25 ± 3 y; Qatar)	RPE (Scale 1-10 by Foster et al., 2001).	session-RPE (AU), Foster RPE scores, cumulative exposure in minutes, cumulative session-RPE calculated over 7-day, 14-day, 21-day, and 28-day periods.	Not reported
2020 Morandi et al. [124]	Observational diagnostic accuracy (14 days)	1st division of the Country (n = 22; males; 27 ± 4 y; Brazil)	RPE (Scale 0-10 by Morandi et al., 2020). TQR scale (Morandi et al., 2020) Heart Rate Monitoring (Polar, Team System 2); not found. Maximal running test (Yo-Yo Endurance Level 2, Bangsbo et al., 1994) Blood Lactate Concentration (Accuspor, not reported); not	session-RPE (AU), Morandi RPE scores Recovery level %HRmax, HR mean, Banister's TRIMP (Banister, 1991), TRIMPMOD (Stagno et al., 2007) Total distance covered and VO$_{2MAX}$ Velocity at 4 mmol.L-1 (vOBLA), and Heart Rate at 4 mmol.L-1 (OBLAHR)	session-RPE (95% Confidence Intervals): CV = 11%, ICC = 0.63 (0.38 – 0.81), SEM = 23%; (5.0% – 2803.0%) Morandi RPE scores: CV = 10%, ICC = 0.74 (0.59 – 0.86), SEM = 30.0% (4.0% – 35.0%) Recovery level (95% Confidence Intervals): CV = 12%, ICC = 0.77 (0.63 – 0.88), SEM = 30% (4.0% – 36.0%) %HRmax: CV = 5%, ICC = 0.89 (0.81 – 0.95), SEM = 27% (1.0% – 189.0%); HR mean: CV = 5%, ICC = 0.89 (0.81 – 0.95), SEM = 27% (1.0%

					– 363.0%); Banister's TRIMP: CV = 12%, ICC = 0.85 (0.74 – 0.92), SEM = 29% (3.0% – 1010%); TRIMPMOD: CV = 13%, ICC = 0.87 (0.78 – 0.94), SEM = 29% (3.0% – 1058.0%)
			found.		
					Not reported
					Not reported
2021 Muñoz-López et al. [125]	Observational prospective cohort (23 days)	National Team (n = 23; males; 26 ± 3 y; European National Soccer Team)	RPE (Scale 6-20 by Borg, 1982). Heart Rate Monitoring (Garmin, HRM-Run); not found.	session-RPE (AU) lnRMSSD (ms), Stress Score (SS; 1000 * 1 / SD2), Sympathetic / parasympathetic Ratio(SS/SD1)	Not reported Not reported
2020 Oliva-Lozano et al. [126]	Observational prospective cohort (282 days)	1st division of the Country (n = 26; males; 26 ± 3 y; Spain)	EPTS (Realtrack Systems, WIMU); Accuracy reported as precision locator <10cm.	Total distance, Total distance covered in metres per minute, as well as from 0 to 6 km/h, from 21 km/h to 24 km/h, and above 21 km/h per minute, Peak speed, Sprints above 24 km/h per minute, total of actions per minute between 21-24 km/h, total number of accelerations (ACC, in m/s2), average accelerometer G-Force, maximum acceleration and decelerations (in m/s2)	Not reported
2020 Owen et al. [127]	Observational prospective cohort (282 days)	1st division of the Country (n = 23; males; 25 ± 3 y; Europe)	Maximal running test (Yo-Yo Intermittent Recovery Test Level 1, Bangsbo et al., 1994) Heart Rate Monitoring (Polar, Team 2 System); not found. RPE (Scale 1-10 by Foster et al., 2001). EPTS (STATSports, Viper	Total distance %HRmax, Average HR (Bpm; HRavg), Maximal HR (BPM; HRmax), Time Above 85% HRmax Session-RPE (AU) Total distance, high-speed (>19.8	Not reported Time Above 85% HRmax: ICC = 0.85 (0.65 – 0.91), Bias ± Random Error = 0.6 ± 5.4 SEM = 2.2% (1.9% – 2.7%) Average HR: ICC =

Pod, 10-Hz); not found	km/h) and sprint distance (>25.5 km/h), as well as average metabolic power (W/kg), high metabolic Power distance (m; $\geq$ 20 W/kg), accelerations (n; $\geq$ 3.3 m/s^2), decelerations (n; $\geq$ -3.3 m/s^2) and the dynamic stress load (AU)	0.77 (0.67 – 0.91), Bias $\pm$ Random Error = 1.5 $\pm$ 10.4, SEM = 3.0% (1.9% – 4.3%); Maximal HR: ICC = 0.79 (0.71 – 0.81), Bias $\pm$ Random Error = 0.3 $\pm$ 4.9, SEM = 2.0% (1.1% – 3.1%) Percentage HRmax: ICC = 0.87 (0.53 – 0.94), Bias $\pm$ Random Error = 0.2 $\pm$ 6.8, SEM = 2.2% (1.1% – 4.1%)

Session-RPE: ICC = 0.57 (0.23 – 0.78), Bias $\pm$ Random Error = 0.1 $\pm$ 1.2, SEM = 5.5% (2.1% – 6.7%)

Total Distance: ICC = 0.94 (0.76 – 0.98), Bias $\pm$ Random Error = 0.8 $\pm$ 5.4, SEM = 2.5% (1.8% – 3.9%); High Speed Distance: ICC = 0.65 (0.45 – 0.81), Bias $\pm$ Random Error = 0.1 $\pm$ 1.2, SEM = 8.1% (2.1% – 10.1%); Average Metabolic Load: ICC = 0.82 (0.76 – 0.91), Bias $\pm$ Random Error = 1.3 $\pm$ 7.5, SEM = 3.4% (1.1% – 5.1%); High Metabolic Load |

					Distance: ICC = 0.78 (0.69 – 0.81), Bias ± Random Error = 0.8 ± 1.9, SEM = 6.1% (4.1% – 10.0%); Sprint Distance: ICC = 0.77 (0.66 – 0.85), Bias ± Random Error = 0.1 ± 2.9, SEM = 16.1% (10.1% – 20.2%); Dynamic Stress Load: ICC = 0.94 (0.76 – 0.98), Bias ± Random Error = 0.8 ± 5.4, SEM = 2.5% (1.8% – 3.9%); Accelerations: ICC = 0.61 (0.55 – 0.73), Bias ± Random Error = 0.3 ± 2.5, SEM = 14.1% (8.1% – 23.1%) Decelerations: ICC = 0.67 (0.51 – 0.71), Bias ± Random Error = 0.1 ± 2.9, SEM = 16.2% (9.1% – 21.3%)
2020 Quintas et al. [128]	Observational prospective cohort (282 days)	1st division of the Country (n = 80; males; 18 ± 3 y; Spain)	EPTS (Realtrack Systems, WIMU); Accuracy reported as precision locator <10cm. Urine Metabolomic (Waters, Elstree, Acquity BEH C18 and Agilent Technologies, Agilent 1290 Infinity UPLC Chromatograph); Accuracy = > 0.998	Total distance (TD) and TD per minute, high metabolic load distance (HMLD) and HMLD per minute, acceleration and acceleration per minute, deceleration and deceleration per minute, high intensity actions (HIA) and HIA per minute, player load and playerload per minute, and high speed running (HSR) and HSR per minute Steroid hormone metabolites: hydrocortisol, tetrahydrodeoxycortisol,	Not reported Precision = 3.0% – 10.0% (median value of the intensities observed for the whole set of quality control replicates)

				dihydrotestosterone glucuronide, androsterone glucuronide, cortolone-3-glucuronide, testosterone glucuronide, tetrahydroaldosterone-3-glucuronide), hypoxanthines (hypoxanthine, 8-hydroxy-7-methylguanine), acetylated amino acids (N-acetylglutamic acid, phenylalanyl-aspartic acid), intermediates in phenylalanine metabolism (2-phenylacetamide, phenylacetic acid), tyrosine, and indolic tryptophan metabolites (indole-3-carboxylic acid, indolepyruvic acid), riboflavin (vitamin B2), and 4-pyridoxic acid, the catabolic product of vitamin B6.	
2020 Rago et al. [129]	Observational prospective cohort (282 days)	2nd division of the Country (n = 13; males; 18 ± 3 y; Italy)	Anaerobic speed reserve; determined as the difference between MSS and MAS, and expressed in km·h-1, (MSS: derived from the maximal speed reached during training; MAS: derived from the Yo-yo Intermittent recovery test level 1, Bangsbo, 1994) EPTS (QStarz, BT-Q1000 Ex, 10 Hz); Velocity Accuracy without aid: 0.1 m/s. Velocity Accuracy DGPS: 0.05m/s. Position Accuracy without aid: 3 m 2D-RMS. Position Accuracy DGPS: 2.5m/s. Position Accuracy <3m CEP (50%) without SA (horizontal)	Maximal aerobic speed (MAS), maximal sprinting speed (MSS) and anaerobic speed reserve (ASR) as < 80% MAS, 80–100% MAS, 100% MAS or 29% ASR and ≥ 30% ASR. Low-speed activities (LSA), moderate-speed running (MSR), high-speed running (HSR) and sprinting were defined using arbitrary speed zones as < 14.4, 14.4–19.8, 19.8–25.1 and ≥ 25.2 km/h as well as individualized by MAS or ASR.	Not reported LSA (< 14.4 km/h): CV = 7.8%, LSA (individualized): CV = 96.9% and Bias (90% CI) = 70.5 (44.4; 96.7); MSR (14.4–19.8 km/h): CV = 53.4%, MSR (individualized): CV = 24.3% and Bias (90% CI) = 69.2 (38.9; 99.5); HSR (19.8–25.1 km/h): CV = 96.5%, HSR (individualized): CV = 57.0% and Bias (90% CI) = 2.3 (1.5; 6.2); Sprinting (≥ 25.2 km/h): CV = 193.5%, Sprinting (individualized): CV = 97.1% and Bias (90% CI) = 2.4 (2.0; 6.9)
2020 Rago et al. [130]	Observational	1st division of the	EPTS (Realtrack Systems,	Total distance, high-speed running (>	Not reported

	prospective cohort (141 days)	Country (n = 17; males; 28 ± 4 y; Spain)	WIMU); Accuracy reported as precision locator <10 cm.	16 km/h; m) and sprinting (> 21 km/h; m), accelerations (> 3 m/s²; n), decelerations (n; < -3 m/s²; n)	Not reported
			Heart Rate Monitoring (Realtrack Systems, WIMU); not found.	%HRmax, HR mean	Not reported
			Video-computerized system (OPTA Client System, not reported); not found	Total distance covered and distance covered above 21 km/h.	Not reported
			Submaximal running test (Yo-Yo Intermittent Recovery Level 1, Bangsbo et al., 2008)	HR mean during the last 30 seconds	
2020 Saidi et al. [131]	Observational prospective cohort (84 days)	1st division of the Country (n = 16; males; 19 to 22 y; Tunisia)	Blood samples (VIDAS, ref.30418 and Matsport, Lactate Pro2); not found (both)	Concentration of cortisol and testosterone (ng/ml), T/C ratio, and blood lactate level (Repeated Sprint Ability)	Cortisol: ICC = 0.74 (0.40 – 0.90); Testosterone: ICC = 0.83 (0.61 – 0.93); T/C: ICC = 0.82 (0.59 – 0.93); blood lactate level = not reported
			Maximal running test (Yo-Yo Intermittent Recovery Test Level 1, Bangsbo et al., 2008)		Distance: ICC = 0.48 (0.51 – 0.78)
			Repeated Sprint Ability (Photoelectric Cell Kit Speed Brower); not reported	Total distance covered (m)	Mean: ICC = 0.61 (0.15 – 0.84); Best: ICC = 0.69 (0.34 – 0.89); Decrement: ICC = 0.34 (-1.26 – 0.58)
			Countermovement Jump and Squat Jump Tests (Microgate, OptoJump); Accuracy = 1 ms	Mean, best, and decrement	
				Jump height (cm)	CMJ: ICC = 0.98 (0.90 – 0.98); SJ: ICC = 0.95 (0.77 – 0.95)
			RPE (Scale 1-10 by Foster et al., 2001)	Session-RPE, Monotony and Strain	
				Total Mood Disturbance	Session-RPE: ICC = 0.77 (-1.20 – 0.93); Monotony: ICC = 0.10 (-0.20 – 0.08); Strain: ICC = 0.004 (-0.51 – 0.13)
			Profile of Mood State questionnaire (POMS, McNair et al., 1971)		

					TMD: ICC = 0.21 (-0.54 – 0.67)
2020 Springham et al. [132]	Observational prospective cohort (275 days)	2nd division of the Country (n = 18; males; 24 ± 4 y; England)	EPTS (Statsports, Viper 2, 10 Hz); not found. RPE (Scale 6-20 by Borg, 1982)	Total distance (TD); high-speed running distance (total distance completed between 19.8 km/h and 80% of individualised maximal linear running velocity; m), high metabolic load distance (> 25 W/kg); number of sprints (total number of sprint efforts > 80% of individualised maximal linear running velocity), accelerations (ACC; > 3 m/s2); decelerations (DEC; > −3 m/s2) and changes to speed (ACC+DEC) Session-RPE, ACWR	Not reported Not reported
2020 Taberner et al. [133]	Observational prospective cohort (2 days)	1st division of the Country (n = 29; males; 23 ± 5 y; England)	EPTS (Statsports, Viper 2 and Apex, 10 Hz); not found, and Video-computerized system (Chyronhego, TRACAB); Accuracy: 7 cm and 100% tracking completeness.	Total distance, high-speed distance (19.8 Km/h – 25.2 Km/h), and sprint distance (> 25.2 Km/h).	Total distance: Bias = 2%-6% (0% – 9%); SEE = 4%-5%, High-speed distance: Bias = 2%-10% (-4% – 16%); SEE = 10%-11%; Sprint distance: Bias = 4%-10% (-2% – 21%); SEE = 14%-22%
2020 Wiig et al. [134]	Observational prospective cohort (224 days)	1st division of the Country (n = 18; males; 26 ± 5 y; Norway)	EPTS (Catapult, OptimEye S5, 10 Hz); Accuracy: 50cm. RPE (Scale 1-10 by Foster et al., 2001)	PlayerLoad, PlayerLoad2D, total distance, High-intensity events (HIE) are the sum of acceleration, deceleration, and change of direction events exceeding a threshold of either HIE > 5.4 km/h, HIE > 9 km/h, HIE > 12.6 km/h, HSRD(> 14.4 km/h), and VHSRD (> 19.8 km/h) Session-RPE	PlayerLoad: CV = 20% (11% – 27%); PlayerLoad2D: CV = 20% (11% – - 26%); Total distance: CV = 16% (9% – 22%); HIE > 5.4 km/h: CV = 19% (10% – 26%); HIE > 9 km/h: CV = 17% (8% – 23%); HIE > 12.6 km/h: CV = 16% (7% – 22%); HSRD (> 14.4 km/h): CV = 13% (6% – 18%); VHSRD (> 19.8 km/h): CV = 13% (5% – 18%) Session-RPE: CV = 18% – 20%

Table S2. Summary of the selected studies

n = sample size; nr = not reported; y = years old; RPE = rating of perceived exertion; CV = coefficient of variation (standard deviation divided by the mean, expressed as a percentage, %); ICC = Intraclass correlation coefficient; SEM = standard error of measurement; HR = heart rate SDNN = the standard deviation of normal RR intervals; pNN50 = percentage of normal RR

intervals greater than 50 ms; RMSSD = root-mean-square difference of successive normal RR intervals; Ln RMSSD = natural logarithm of the RMSSD; HF = power density in the high frequency band (HF, >0.15-0.40 Hz); SD1 = standard deviation of instantaneous beat-to-beat variability data; CMJ = countermovement jump; CMJAS = countermovement jump with arm swing; CMJD = dominant leg countermovement jump; CMJnD = non dominant countermovement jump; V3: running velocity associated with a [La]b of 3 mmol·l-1; Lac: lactate; BdL = body load; DC = total distance covered; EI = exertion index; TRIMPMOD = modified training impulse; %CKmáx = CK relative to the maximum concentration of the values observed throughout the season in the athlete; %ΔCKmáx = CK relative to the maximum variation delta in the values concentration observed during the season; TQR = total quality recovery; tHR70 = time spent with heart rate above 70% of individual maximum; tHR80 = time spent with heart rate above 80% of individual maximum; tHR85= time spent with heart rate above 85% of individual maximum; %tHR70 = the % of session time spent with heart rate above 70% of individual maximum; %tHR80 = the % of session time spent with heart rate above 80% of individual maximum; %tHR85 = the % of session time spent with heart rate above 85% of individual maximum; avHR%max = average heart rate expressed as % of individual maximum; Mrr = mean RR interval; mean HR = mean of heart rate; RMSSD = square root of the mean of the sum of the squares of differences between adjacent normal RR intervals; SDNN = standard deviation of all NN [RRintervals] interval; SD1 = short-term beat-to-beat variability; SD2 = long-term beat-to-beat variability; LF/HF = The ratio index was calculated from the non-transformed LF and HF data. Fast Fourier Transform (Welch's periodogram: 300-s window with 50% overlap)[51] was used to obtain measures of nocturnal cardiac autonomic activity in the frequency domain, considering both LF (0.004–0.15 Hz) and HF (0.15–0.4 Hz) indices. ln = log-transformed by taking the natural logarithm before conducting any statistical analyses; sIgA = Salivary Imunoglobulina A concentration (μg/mL); ACWR = acute chronic workload ratio; RPEPrevPlayer = mean of the RPE provided by a player in the previous week (6 days); EPTS = electronic performance tracking systems; ms = millisecond; cm = centimeter; m = meter; G = gravity units; MDC = minimum detectable change; LDH = lactate dehydrogenase, CK = creatine kinase CRP = C-reactive protein; SEE = standard error estimate

Observational study designs: These studies are those where the investigator is not acting upon study participants, but instead observing natural relationships between factors and outcomes [149].

Observational cross-sectional study design: These studies consist of assessing a population, as represented by the study sample, at a single point in time [149].

Observational prospective cohort study design: These studies begin with a cross-sectional study to categorize exposure and identify cases and following the participants through time to identify which participants develop the outcome(s) of interest [149].

Observational retrospective cohort study design: These studies begin with a cross-sectional study to categorize exposure and identify cases and following the participants through past time to identify which participants develop the outcome(s) of interest [149].

Observational diagnostic accuracy study: are those studies that compare a new diagnostic method with the current "gold standard" diagnostic procedure in a cross-section of both diseased and health study participants [149].

Experimental study designs: These studies are those which the researcher interveness at some point throughout the study [149].

Experimental pre-post study design: A pre-post study measures the occurrence of an out come before and again after a particular intervention is implemented. Pre-post studies may be single arm, one group measured before the intervention and again after the intervention, or multiple arms, where there is a comparison between groups [149].

Experimental crossover randomized controlled trial: is a type of experimental study design where study participants intentionally "crossover" to the other treatment arm [149].

Experimental randomized controlled trial study design: These studies take a homogenous group of study participants and randomly divide them into two separate groups. The intervention is then implemented in one group and not the other and comparisons of intervention efficacy between the two groups are analysed [149]. **Experimental non-randomized trial:** they are interventional studies that compare a group where an intervention was performed with a group where there was no intervention [149].