

Name: Characteristics of Included Studies

Article Title: Submaximal Fitness Tests in Team Sports: A Theoretical Framework for Evaluating Physiological State

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Supplementary File S3: characteristics of the included studies

Study	Participants					Methodology			SMFT						Outcome Measure		
	Age	Sex	N	Sport	Level	Settings	Design	Obs/Int period	Protocol	Move. Patt.	Test	Dur.	Int.	Dimensions	Cardiorespiratory/ Metabolic	Perceptual	Mechanical
Altman et al. 2020 (83)	23.7 ± 3.9	M	97	Soccer	E, NE	Training	RM	LT	CI	L	-	12min	6–12km·h ⁻¹	Treadmill	HReX [%]		
Aoki et al. 2017 (60)	27.8 ± 6.4	M	9	Basketball	E	Training	Pre-post	LT	CF	C	5'-5'	5'-5'min	10km·h ⁻¹	40m shuttle	HReX [%] HRR [%d]		
Bradley et al. 2011 (84)	NS	M	32–46	Soccer	E	Training	RM	LT	II	C	Yo-YoIE2	4/6min	17.5km·h ⁻¹	20m shuttle	HReX [a] HReX [%]		
Bradley et al. 2014 (6)	23.0 ± 2.0	F	28	Soccer	E	Training	Correlational RM	LT	II	C	Yo-YoIE2	2/4min	16.5/17.5 km·h ⁻¹	20m shuttle	HReX [%]		
Brink et al. 2010 (86)	17.0 ± 0.5	M	18	Soccer	E	Training	RM	LT	II	C	ISRT	9–12min	14–15km·h ⁻¹	20m shuttle	HReX [a]		
Brink et al. 2012 (85)	17.0 ± 1.0	M	7	Soccer	E	Training	RM	LT	II	C	ISRT	9–12min	14–15km·h ⁻¹	20m shuttle	HReX [a]		
Brink et al. 2013 (87)	17.0 ± 1.0	M	14	Soccer	E	Training	RM	LT	II	C	ISRT	9–12min	14–15km·h ⁻¹	20m shuttle	HReX [a]		
Buchheit et al. 2010 (45)	13.9	M	18	Soccer	E	Camp	RM	AC/ST	CF	L	5'-5'	5'-5'min	9km·h ⁻¹	Track	HReX [%] HRR [d] Ln rMSSD		
	15.7		15														
Buchheit et al. 2011a (69)	17.0 ± 1.0	M	12	Ice Hockey	E	-	Test-retest	-	II	C	30-15IFT	3/6min	12.7/15.2 km·h ⁻¹	40m shuttle	HReX [a]		
Buchheit et al. 2013b (56)	16.0 ± 0.4 18.1 ± 1.0	M	13 15	Soccer	NS	Altitude	RM	ST	CF	C	Short shuttle	5min	9km·h ⁻¹	20m shuttle	HReX [%]	RPE[CR10]	
Buchheit et al. 2013c (108)	16.0 ± 0.4 18.1 ± 1.0	M	20 19	Soccer	NS	Altitude	RM	ST	CF	C	Short shuttle	5min	9km·h ⁻¹	20m shuttle	HReX [%]	RPE[CR10]	
Buchheit et al. 2012 (107)	15.1 ± 1.5	M	46	Soccer	NE	Training	RM	LT	CF	L	5'-5'	5'-5'min	9km·h ⁻¹	Track	HReX [%] HRR [%d] HRR [d] Ln rMSSD		
Buchheit et al. 2011b (57)	26.2 ± 5.0	M	15	Soccer	NE	Heat	RM	AC/ST	CF	C	5'-5'	5'-5'min	9km·h ⁻¹	~80m shuttle	HReX [%] HRR [d] Ln SD1	RPE[CR10]	
Buchheit et al. 2013a (106)	21.9 ± 2.0	M	18	ARF	E	Heat	RM	AC/ST	CF	C	5'-5'	5'-5'min	13km·h ⁻¹	40m shuttle	HReX [%] Ln SD1		Level 1: TD, HIR
Buchheit et al. 2015 (58)	24.3 ± 4.2	M	36	ARF	E	Break	Pre-post	ST	CF	C	Long shuttle	5min	12km·h ⁻¹	~80m shuttle	HReX [NA]	RPE[NA]	
									IV	MD	Handball	8min	-	141m ² /player			Level 1: TD, HIR, maxV Level 2: Acc ± 3m·s ⁻²
Buchheit et al. 2016 (55)	24.6 ± 5.3	M	12	Soccer	E	Heat	RM	AC/ST	CF	C	Rectangle HIR bursts	4min 4×12sec	12km·h ⁻¹ ~18km·h ⁻¹	100*50m ~60m	HReX [NA]		Level 3: vL/fL
Buchheit et al. 2018 (49)	17.0 ± 2.0	M	18	Soccer	E	Training	RM	AC	IF	L	HIR bursts	4*12sec	22–24km·h ⁻¹	~60m			Level 3: Stiffness (K) vL/fL

																Fpeak
Buchheit et al. 2008 (61)	15.6 ± 0.8	M	15	Handball	NE	HIT/RST	Pre-post	LT	CF	L	-	6min	60%V _{IFT}	Track	HReX [%] HRR [<i>d</i>] HRR [a] HRR [7] rMSSD SDNN	
Buchheit et al. 2020 (11)	23.0 ± 3.0	M	19	Soccer	E	Training	Pre-Post/ RM	LT	CI	L	-	12min	8–12km·h ⁻¹	Treadmill	HReX [%]	
Castanga et al. 2010 (67)	15.3 ± 0.6	M	14	Basketball	E	-	Correlational	-	CI	C	Short shuttle	3×4min	9/10/11km·h ⁻¹	20m shuttle	HReX [%] B[La]	RPE[CR10]
Cornforth et al. 2014 (102)	20.0 ± 3.0	M	20–27	ARF	E	Training	RM	LT	CI	C	Medium shuttle	4×2min	9.3/11.1/12.8/ 14.6 km·h ⁻¹	50m shuttle	HReX [a] HRR[% <i>d</i>]	
Araújo et al. 2019 (105)	24.0 ± 4.0	M	16	Soccer	E	-	Correlational	-	II	C	ISRT	2-9min	11–14km·h ⁻¹	20m shuttle	HReX [%]	
	24.0 ± 4.0	M	14		NE										HRR [a]*	
	21.0 ± 4.0	F	14–16		E											
	25.0 ± 5.0	F	14–16		NE											
de Freitas et al. 2015 (59)	24.9 ± 4.0	M	10	Futsal	E	Training	Pre-post	LT	CF	L	5'–5'	5min	9km·h ⁻¹	20m rectangle	HReX [%] HReX [a] HRR [<i>d</i>] Ln rMSSD	
															HReX [%] HReX [a]	
Deprez et al. 2014 (109)	12.5 ± 0.6	M	9–27	Soccer	M	-	Test-retest	-	II	C	Yo-YoIR1	3/4/7min	14–15km·h ⁻¹	20m shuttle	HReX [%]	
	14.0 ± 0.5		8–26												HRR [%]*	
	16.1 ± 0.6		4–19													
Deprez et al. 2015 (110)	13.9 ± 0.5	M	22	Soccer	E	-	Test-retest	-	II	C	Yo-YoIR1	6.5min	14.5km·h ⁻¹	20m shuttle	HReX [%]	
	16.2 ± 0.6		10												HRR [%]*	
	18.1 ± 0.4		4													
Delisle-Houde et al. 2019 (74)	22.7 ± 1.3	M	24	Ice Hockey	NE	Training	RM	LT	CF	L	Cycling	4min	75%VO ₂ power	-	HReX [a]	
	19.9 ± 1.8	F	20												HRR [a] B[La]	
Dello Iacono et al. 2019 (70)	18.5 ± 0.6	M	10	Soccer	E	-	Test-retest	-	IV	MD	Passing drill	12min	-	Half-two third pitch	HReX [%]	RPE[CR10] Level 1: TD, HIR, SR
	18.7 ± 0.6		10													
Dillern et al. 2017 (75)	21.9 ± 3.5	M	17	Soccer	NS	Post-match	RM	AC	CF	L	-	10min	90%AT	Treadmill	HReX [a] Oxygen uptake RER B[La]	RPE[6–20]
Dubois et al. 2018 (90)	26.9 ± 1.9	M	14	Rugby Union	E	Training	RM	LT	CF	L	5'–5'	5'–5'min	10/11km·h ⁻¹	Treadmill	HReX [a] HRR [a]	
Dobbin et al. 2018 (76)	20.4 ± 1.2	M	17	Rugby	NE	-	Test-retest	-	II	C	Yo-YoIR1	1.5/2.5/4 min	13–14km·h ⁻¹	20m shuttle	HReX [a] Oxygen uptake Ventilation B[La]	RPE[6–20] Level 3: AL _{VM} (AU)
Dobbin et al. 2020 (88)	17.1 ± 1.0	M	31	Rugby	E	SIT	Pre-Post	ST	II	C	Yo-YoIR1	1.5/2.5/4 min	13–14km·h ⁻¹	20m shuttle	HReX[a] HRR[<i>d</i>]	Level 2: Acc >3m·s ⁻² MP Level 3: AL _{VM} (AU)
Doncaster et al. 2018 (89)	12.9 ± 0.7	M	8	Soccer	E	-	Test-retest	-	II	C	Yo-YoIR1	3/6min	14/14.5km·h ⁻¹	20m shuttle	HReX [a] HReX [%] HRR [a]	

															HRR [%]	
Fanchini et al. 2014 (92)	17.0 ± 1.0	M	24	Soccer	E	Training	Test-retest Correlational Pre-post	LT	II	C	Yo-YoIR1	6min	14.5km·h ⁻¹	20m shuttle	HRR[a]	
Fanchini et al. 2015 (91)	24.0 ± 6.0	M	11–13	Soccer	NE	Training	Pre-post	LT	II	C	Yo-YoIR1	6min	14.5km·h ⁻¹	20m shuttle	HREx [a] HRR [%]	RPE[CR100]
Fitzpatrick et al. 2019a (65)	17.4 ± 0.5	M	15	Soccer	E		Test-retest	-	CF	C	Short shuttle	2–4min	12km·h ⁻¹	20m shuttle		Level 3: AL _{VM} (AU) AL _{VM} (%)
Fitzpatrick et al. 2019b (167)	17.5 ± 0.5	M	12	Soccer	E	Training	Pre-post	AC	CF	C	Short shuttle	3min	12km·h ⁻¹	20m shuttle		Level 3: AL _{VM} (AU) AL _{VM} (%)
Feroli et al. 2018 (77)	25.6 ± 6.0 23.3 ± 4.7	M	14 18	Basketball	E NE	Training	Pre-post	LT	CF	L	Mognomi's	6min	13.5km·h ⁻¹	NS	B[La]	
Fox et al. 2017 (121)	19.0 ± 1.0	M	13	Soccer	E	Training	RM	LT	II	C	Yo-YoIR1	6min	14.5km·h ⁻¹	20m shuttle	HREx HRR [d] HRR [%d]	
Francini et al. 2019 (111)	12.0-16.0	M	68	Soccer	NE	-	Correlational	-	CF	L	Mognomi's	6min	13.5km·h ⁻¹	Track	HREx [%] B[La] H ⁺ HCO ³	
									II	C	Yo-YoIR1	6min	14.5km·h ⁻¹	20m shuttle	HREx [%]	
Garret et al. 2019a (68)	22.5 ± 4.2 22.3 ± 2.9	M	12 11	ARF	E NE	Post-match	RM	AC	IF	L	HIR bursts	8sec	~22.5km·h ⁻¹	50m		Level 3: AL _{VM} (AU)
Garret et al. 2019b (168)	22.5 ± 4.2 22.3 ± 2.9	M	12 11	ARF	E NE	-	Test-retest	-	IF	L	HIR bursts	8sec	~22.5km·h ⁻¹	50m		Level 3: AL _{VM} (AU)
Garret et al. 2021 (169)	18.3 ± 0.5	M	20	Soccer	NE	Post-match	Pre-post	AC	IF	L	HIR bursts	10sec	~18km·h ⁻¹	50m		MaxV
Garvican et al. 2014 (93)	18.8 ± 1.0	M	12	Soccer	E	Altitude	RM	AC/ST	CF	C	Short shuttle	5min	11km·h ⁻¹	20m shuttle	HREx [a]	
Haddad et al. 2013 (50)	18.2 ± 0.5	M	17	Soccer	E	Training	RM	LT	CF	L	Track	10min	75% HR _{RESERVE}	-		RPE[CR10]
Harry & Booyesen 2020 (123)	23.0 ± 3.7	F	32	Field Hockey	NE	-	Correlational	-	II	C	Yo-YoIR1	6 min	14.5km·h ⁻¹	20m shuttle	HRR [d]	
Hulin et al. 2019 (51)	24.1 ± 3.4	M	17–32	Rugby	E	Training	Test-retest Pre-post	- LT	II	C	Yo-YoIR1	4/6min	14/14.5km·h ⁻¹	20m shuttle	HREx [%]	
Hulin et al. 2020 (118)	24.1 ± 4.0	M	45	Rugby	E	Training		LT	II	C	Yo-YoIR1	4 min	14km·h ⁻¹	20m shuttle	HREx [%]	
Hulka et al. 2015 (94)	17.7 ± 1.5	25	25	Football	E	-	Test-retest	-	IV	MD	4V4 SSG	3×4min	-	80m ² /player	HREx [a]	Level 1: TD
Hulse et al. 2013 (95)	U9-11 U12-14 U15-18	M	13 15 18	Soccer	E	-	Test-retest	-	II	C	MSFT	5.5min	10.5km·h ⁻¹	20m shuttle	HREx [a] HRR [a]	
Iaia et al. 2017 (78)	17.0 ± 1.0	M	19	Soccer	NE	HIT	Pre-post	LT	CF	L	Mognomi's	6min	13.5km·h ⁻¹	Track	B[La]	
Ingebrigtsen et al. 2012 (96)	26.0 ± 7.0 20.0 ± 3.0	M	12 39	Soccer	E NE	-	Correlational	-	II	C	Yo-YoIR1/2	2/4min	14–16km·h ⁻¹	20m shuttle	HREx [a] HREx [%]	
Ingebrigtsen et al. 2014 (122)	22.0 ± 0.5	M	10–57	Soccer	M	-	Test-retest Correlational	-	II	C	Yo-YoIR1/2	2/4/6min	14–16.5km·h ⁻¹	20m shuttle	HREx [NA]	
	26.0 ± 5.0	M	10	Soccer	E	Training	RM	LT	CF	C	Rectangle	4min	12km·h ⁻¹	100*50m	HREx [NA]	

Lacome et al. 2018 (71)									IV		5V5-10V10 SSG	NS	-	117±65m ² /player			Level 1: TD, HIR Level 3: vL, fL, MechW
Lignell et al. 2018 (112)	28.0 ± 1.0	M	18	Ice Hockey	E	Post-match	Pre-post Correlational	AC	II	C	Yo-YoIR1	6min	14.5km·h ⁻¹	20m shuttle	HRex [%]		
Leduc et al. 2019 (52)	21.0 ± 1.3	M	17	Rugby	NE	Training	RM	AC	IF	L	HIR bursts	12sec	~18km·h ⁻¹	~60m			Level 3: RLI
Mohr & Krustrup 2014 (46)	25.8 ± 4.1	M	172	Soccer	NE	Training	RM Correlational	LT	II	C	Yo-YoIR1	6min	14.5km·h ⁻¹	20m shuttle	HRex [%]		
Malone et al. 2017 (54)	24.3 ± 6.1	M	22	Gaelic Football	E	Camp	RM	AC/ST	CF	C	5'-5'	5'-5'min	13km·h ⁻¹	40m shuttle	HRex [%] HRR [d]		Level 1: TD, HIR, maxV
									IV	MD	Touchdown	4min	-	150m ² /player			
Meylan et al. 2021 (104)	27.0 ± 5.0	F	16	Soccer	E	Heat	RM	ST	CF	C	Medium shuttle	5min	12km·h ⁻¹	40m shuttle	HRex[a] HRR [d] HRex[a]	RPE	TD IMA
									IV	MD	4V4 SSG	4×2min	-	140m ² /player			
Moreira et al. 2021 (103)	19.0 ± 1.0	M	12	Soccer	E	Post-match	Pre-post	AC	CF	C	Medium shuttle	5min	10km·h ⁻¹	40m shuttle	HRex[a] HRR [d]		
Nakamura et al. 2017 (117)	24.5 ± 3.7 24.8 ± 5.6	M	17 25	Rugby Union	E	-	Performance test	-	II	C	Yo-YoIR1	2min	13.5km·h ⁻¹	20m shuttle	HRex [%]		
Natera et al. 2019 (97)	28.1 ± 1.5	M	8	Rugby Union	NE	-	Test-retest	-	II	C	30-15IFT	-	13km·h ⁻¹ 25/50/75%V _{IFT}	40m shuttle	HRex [a] HRex [RESERVE] HRR [a]		
Nikolaidis et al. 2015 (155)	13.8 ± 0.6	F	28	Volleyball	NS	-	Correlational	-	CI	L	PCW170	3×3min	Up to 170 bpm	-			Power (W)
Owen et al. 2012 (72)	24.5 ± 3.5	M	15	Soccer	E	Training	Pre-post	LT	CI	L	-	3×3min	9/11/14 km·h ⁻¹	Treadmill	Oxygen uptake RER HRex [a]		
Owen et al. 2017 (99)	17.8 ± 0.5	M	10	Soccer	E	-	Test-retest	-	II	C	Yo-YoIR1	6min		20m shuttle	HRex [a] HRR [a] HRR [%d]		
Owen et al. 2020 (98)	25.3 ± 3.1	M	23	Soccer	E	-	Test-retest Correlational	-	IV	MD	5V5 SSG	3×3min	-	62.5m ² /player	HRex [a] HRex [%]	RPE[CR10]	Level 1: TD, HIR Level 2: Acc, Dec, MP Level 3: DSL
Pereira et al. 2019 (100)	11.5 ± 0.6	M	40	Soccer	NE	-	Correlational	-	CF	C	5'-5'	5'-5'min	9km·h ⁻¹	20m rectangle	HRex [a] HRR [d] Ln rMSSD		
Prajapat et al. 2019 (125)	21.1 ± 2.1 21.4 ± 2.1 20.4 ± 1.6	M	20 18 17	Soccer Basketball Field Hockey	NE	-	Performance test	-	CI	L	-	-	Up to HRT	Treadmill	HRR [a]		

Rabbani et al. 2018a (66)	25.1 ± 4.0 26.7 ± 4.9	M	12–14	Soccer	E	-	Test-retest Correlational	-	CF	C	Long shuttle	4min	12km·h ⁻¹	100m shuttle	HRex [a] HRex [%] HRR [<i>d</i>] HRR [% <i>d</i>] HRR [a] HRR [%]	
Rabbani et al. 2018b (113)	26.1 ± 5.7	M	14	Soccer	E	Training	Pre-post	LT	CF	C	Long shuttle	4min	12km·h ⁻¹	100m shuttle	HRex [%] HRR [% <i>d</i>] HRR [%]	
Rago et al. 2020 (120)	27.8 ± 3.9	M	17	Soccer	E	Training	RM	LT	II	C	Yo-YoIR1	6:51min	14.5km·h ⁻¹	20m shuttle	HRex [%]	
Racinais et al. 2014 (132)	21.9 ± 2.0	M	18	ARF	E	Heat	RM	AC/ST	IV	MD	5 star drills	4-5min	-	15-25m		Level 1: TD, HIR
Rampinini et al. 2021 (79)	25.4 ± 5.0	M	50	Soccer	E	Breat	Pre-post	LT	CF	L	Mognomi's	6min	13.5km·h ⁻¹	300m track	B[La]	
Reinhardt et al. 2020 (70)	23.5 ± 3.7	M	14	Soccer	NE	-	Correlational	-	IV	MD	4V4 SSG	6×1.5min	-	120m ² /player	HRex [%] HRR [s] B[La]	Level 1: TD, HIR Level 2: Acc
Rowell et al. 2018 (72)	25.2 ± 5.5	M	21	Soccer	E	Training	RM	LT	IV	MD	5V5+5 SSG	4×3min	-	135m ² /player		Level 1: TD, HIR Level 3: AL, AL _{VM} , AL _{2D} , AL _{SLOW} (AU)
Ryan et al. 2019 (119)	24.6 ± 4.0	M	45	ARF	E	Training	Test-retest RM	LT	CF	C	Long shuttle	5 min	12km·h ⁻¹	80m shuttle	HRex [%] HRR [<i>d</i>]	
Scott et al. 2018 (12)	23.2 ± 3.4	M	22	Rugby	E	-	Test-retest	-	CF	C	Ind. shuttle	4min	75%1500m/ 60%V _{IFT}	57-68m shuttle	HRex [%] HRR [% <i>d</i>]	
Signorelli et al. 2012 (82)	25.0 ± 4.0	M	162	Soccer	E	-	Performance test	-	CI	L	Incremental run	5min	8–12km·h ⁻¹	Treadmill	HRex [a] Oxygen uptake	
Starling et al. 2021 (124)	23.0 ± 2.0		22	Rugby	NE	Post- match	RM	ST	CI	C	Short shuttle	5min	8–12km·h ⁻¹	20m shuttle	HRR [<i>d</i>]	
Thorpe et al. 2015 (53)	19.1 ± 0.6	M	10	Soccer	E	Training	RM	AC/ST	CF	L	5'–5' Cycling	5min	130W/85RPM	-	HRex [%] HRR [<i>d</i>] HRR [% <i>d</i>] Ln rMSSD	
Thorpe et al. 2016 (47)	27.0 ± 5.1	M	29	Soccer	E	Training	RM	LT	CF	L	5'–5' Cycling	5min	130W/85RPM	-	HRex [a] HRR [<i>d</i>] HRR [% <i>d</i>] Ln rMSSD	
Thorpe et al. 2017 (114)	19.1 ± 0.6	M	10	Soccer	E	Training	RM	AC/ST	CF	L	5'–5' Cycling	5min	130W/85RPM	-	HRex [%] HRR [<i>d</i>] HRR [% <i>d</i>] Ln rMSSD	
Vachon et al. 2021 (126)	18.0 ± 1.0	M	13	Rugby Union	E	Training (taper)	Pre-post	ST	CF	L	5'–5' Cycling	5min	200W	-	HRex [NA] HRR [T]	
Veugelers et al. 2016 (48)	23.0 ± 4.0	M	25–38	ARF	E	-	Test-retest Correlational	-	II	C	Yo-YoIR2 Mod. Yo-YoIR2	2–8min	16.5–17.5km·h ⁻¹ 1 14.9–15.8km·h ⁻¹ 1	20m shuttle	HRex [%] HRR [<i>d</i>]	

Vigh-Larsen et al. 2019 (115)	23.5 ± 4.4 19.4 ± 2.9	M	245	Ice Hockey	M	-	Correlational	-	II	C	Yo-YoIR1	6min	14.5km·h ⁻¹	20m shuttle	HREx [%]	
Younesi et al. 2021a (116)	27.2 ± 3.4	M	16	Soccer	E	-	Correlational	-	IV	MD	3V3 SSG	2×3min	-	67.5m ² /player	HREx [%]	Level 1: TD, HIR Level 2: Acc ±2.2m·s ⁻²
Younesi et al. 2021b (101)	28.1 ± 4.6	M	20	Soccer	E	-	Test-retest	-	IV	MD	3V3-6V6 SSG	3×3-6min	-	~70m ² /player	HREx [a]	
Younesi et al. 2021c (156)	28.1 ± 4.6	M	20	Soccer	E	-	Test-retest	-	IV	MD	3V3-6V6 SSG	3×3-6min	-	~70m ² /player		Level 1: TD, HIR Level 2: Acc

N: sample size, **Obs:** observation, **Int:** intervention, **SMFT:** sub-maximal fitness test, **Dur:** duration, **Int:** intensity, **M:** male, **F:** female, **E:** elite, **H+:** hydrogen ions, **HCO³⁻:** bicarbonate, **m:** meters, **min:** minute, **~:** approximately, **NE:** non-elite, **NS:** not specified, **RM:** repeated measures, **AC:** acute, **ST:** short-term, **LT:** long-term, **CF:** continuous-fixed, **CI:** continuous-incremental, **IF:** intermittent-fixed, **II:** intermittent-incremental, **IV:** intermittent-variable, **L:** linear, **C:** change of direction, **DB:** drill-based, **GB:** game-based, **km·h⁻¹:** kilometer per hour, **HIT:** high intensity interval training, **RST:** repeated sprint training, **30-15IFT:** 30-15 intermittent fitness test, **Yo-YoIR1:** yo-yo intermittent recovery test level 1, **Yo-YoIR2:** yo-yo intermittent recovery test level 2, **Yo-YoIE2:** yo-yo intermittent endurance level 2, **mod:** modified, **ISRT:** interval shuttle run test, **HIR:** high-intensity run, **SSG:** small sided game, **Ind:** individualised, **MSFT:** multi stage fitness test, **PCW 170:** physical work capacity test, **HREx:** exercise heart rate, **HRR:** heart rate recovery, **rMSSD:** square root of the root mean square of the sum of all differences between successive normal heartbeats heart rate variability, **Ln rMSSD:** log-transformed rMSSD, **Ln SD1:** natural log of standard deviation of successive R spikes measured from Poincaré plots, **SDNN:** standard deviation of mean interval differences between normal heartbeats, **B[La]:** lactate, **RER:** respiratory exchange ratio, **RPE:** rating of perceived exertion, **TD:** total distance, **maxV:** maximal velocity, **Mov Patt:** movement pattern, **vL:** velocity load, **fl:** force load **Acc:** acceleration, **IMA:** inertial movement analysis, **vL:** velocity load, **fl:** force load, **AL_{vm}:** accelerometry-load vector magnitude, **AL_{slow}:** component when the velocity is < 2m·s⁻¹, **AL_{2D}:** individual vector component of AL excluding the vertical vector magnitude, **mechW:** mechanical work, **MP:** metabolic power, **DSL:** dynamic stress index, **RLI:** running load index, **SIT:** sprint interval training.

Obs/Int periods were classified as *acute* immediate, daily and up to one standard micro-cycle, *short-term* longer than one but less than four weeks, and *long-term* equal or more than four weeks.

HRR include () were collected from maximal versions of the SMFT protocol.