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The impact of training regimens on small-sided soccer games: A scoping review

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Abstract

This scoping review aimed to map and summarize the literature examining how different small-sided games (SSG) training regimens affect physical, psychophysiological, technical, and tactical outcomes in soccer players. Following PRISMA-ScR guidelines, three databases were searched up to August 28, 2025. Eligible studies directly compared at least two SSG regimens (continuous vs. intermittent; intermittent formats with differing work durations; or intermittent formats with differing rest durations). In total, 29 studies were included. Across comparison types, continuous vs. intermittent regimens were the most studied, particularly for physiological measures (n=15), followed by intermittent comparisons manipulating bout duration (n=14 for physiological, n=11 for physical outcomes). Studies focusing on rest/density manipulations were fewer, especially for technical outcomes (n=3). Most studies clustered around mid-sized SSG formats (3v3–5v5), with 4v4 particularly dominant in continuous–intermittent contrasts (n=9). In contrast, very small-sided formats (1v1, 2v2) and larger-sided formats (6v6, 7v7) were rarely explored under these regimen comparisons. Manipulations of bout and rest durations revealed consistent influences on physical and psychophysiological outcomes, but findings were often sample- and context-specific. Evidence regarding technical outcomes was limited and heterogeneous, with some indication that continuous formats may favor ball retention and accuracy, while intermittent play promotes defensive and contested actions. Tactical outcomes were not objectively quantified in any study. In conclusion, current evidence is largely focused on physical and psychophysiological responses, while technical and especially tactical domains remain underexplored. Further research across different competitive levels, incorporating objective tactical analyses, is needed to better guide training prescriptions.

Keywords: football; conditioned games; sided-games; physiological; technical; tactical; external load; internal load.

1. Introduction

Small-sided games (SSGs) are popular training drills in soccer, enabling coaches to integrate technical, tactical, physical, and psychological elements within a single practice format [1]. By manipulating task constraints such as pitch dimensions, number of players, or game rules, coaches can design SSGs that target different demands of match play while adjusting the training stimulus to specific objectives [2–4]. Because of this versatility, SSGs have become a frequent part of soccer training across age groups and competitive levels [5,6].

An important factor influencing the outcomes of SSGs is the training regimen used to structure play. Two primary approaches are commonly employed [7]: continuous formats, in which players engage without pauses for a set duration, and intermittent formats, where periods of play are interspersed with rest intervals. Continuous SSGs are more similar to real match scenarios because they are prolonged and involve fluctuating demands, just like in competition [8]. In contrast, intermittent SSGs may allow players to perform actions at higher intensity during work bouts, owing to the recovery provided by rest intervals [9,10].

Within intermittent designs, further variation is possible through the manipulation of work-to-rest ratios (or "density") [11]. A high-density format (short rest periods relative to work) typically promotes greater cardiovascular and metabolic stress, while a lower-density format (longer recovery periods) may favor repeated high-intensity efforts with better technical execution [12]. Thus, the choice of regimen—continuous, intermittent, or intermittent with varying densities—may influence the psychophysiological responses (e.g., heart rate [HR], lactate, rating of perceived exertion [RPE]), physical outputs (e.g., distances, accelerations), and technical-tactical performance exhibited during SSGs [11,12].

Despite the growing volume of research, to date there has been no synthesis mapping how different training regimens influence outcomes in SSGs. Most existing reviews have focused on SSGs more broadly (e.g., pitch size, player numbers, rule modifications) [13–16], but have not systematically compared continuous and intermittent formats, nor the variations in work-to-rest ratio within intermittent play. As a result, there is a limited understanding of the state of knowledge in this domain and a lack of clarity about where evidence is consistent, where it is fragmented, and where gaps remain.

Therefore, this scoping review aims to systematically map and summarize the literature examining the effects of different training regimens in SSGs—including continuous formats, intermittent formats, and intermittent formats with varying work-to-rest ratios—on physical, psychophysiological, technical, and tactical outcomes. This synthesis aims to provide a clearer understanding of how training structure modulates responses to SSGs and highlight areas requiring further research.

2. Methods

The protocol for this scoping review was prospectively registered in the Open Science Framework (OSF) on 28/08/2025 (registration code: osf.io/3nmqd). The review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) guidelines [17].

2.1.Eligibility criteria

In line with the Population–Concept–Context (PCC) framework developed by the Joanna Briggs Institute and recommended for scoping reviews (reference), we defined the eligibility criteria.

Comentado [DCA1]: I think is better to include the reference of PCC concept here.

2.1.1. Population

Inclusion: Soccer players of any age, sex, or competitive level. Studies must involve healthy participants who are actively engaged in training or competition.

Exclusion: Non-athlete populations (e.g., physical education students without organized training, recreational adults not involved in structured sport) and athletes from sports other than soccer. Clinical or injured players are also excluded.

2.1.2. Concept

Inclusion: Studies explicitly examining and comparing training regimens within SSGs, including: Continuous formats (uninterrupted play of fixed duration); Intermittent formats (play interspersed with predefined recovery periods); Intermittent formats with different work-to-rest ratios (e.g., 1:1, 1:2). SSGs implemented as structured training interventions, whether acutely (single session) or longitudinally (multiple sessions/seasonal). Outcomes of interest: Physical (e.g., external load measured by means of distances covered or accelerations or compounds of variables); Psychophysiological (e.g., HR, RPE, hormonal or metabolic responses); Technical (e.g., passing accuracy, number of technical actions); Tactical (e.g., team organization, positional and spatial-temporal variables).

Exclusion: Studies focusing only on other SSG task constrains (pitch size, player number, rule constraints) without manipulating the training regimen. SSGs used solely as an assessment or testing tool, not as a training stimulus. Studies where SSGs are combined with other interventions (e.g., resistance training, sprint training), unless the isolated effect of regimen structure can be discerned. Studies reporting exclusively psychological

(e.g., enjoyment, motivation) or sociological outcomes without physical, psychophysiological, technical, or tactical data.

2.1.3. Context

Inclusion: Training-based studies conducted in competitive sport contexts (e.g., club, academy, professional team environments). No restriction on geographic location or competitive season.

Exclusion: Non-sport contexts (e.g., general education, recreational programs for older).

2.1.4. Types of Sources

Inclusion: Original empirical research of any design (randomized controlled trials, quasi-experimental studies, crossover, repeated-measures, observational). Full-text articles published in peer-reviewed journals with adequate methodological detail. Publications in any language. No publication year restriction.

Exclusion: Reviews, meta-analyses, editorials, commentaries, opinion papers, book chapters, theses, conference abstracts/articles or dissertations. Abstract-only publications without sufficient methodological detail.

2.2.Information sources and search strategy

Searches were conducted in PubMed, Scopus, Web of Science (Core Collection). The final searches were conducted on 28 August 2025. To ensure the evidence base was as complete as possible, additional searches of grey literature were carried out in Google Scholar. Reference lists of all included studies and related reviews were manually screened to identify further eligible articles, and a snowballing process was applied to capture additional studies through forward and backward citation tracking. Moreover, domain experts in SSGs and sport science were consulted to verify the

comprehensiveness of the search and to identify studies that may not have been retrieved through database searching.

The search strategy was developed by combining free-text terms with Boolean operators to optimize retrieval. The final search string was:

[Title/Abstract] ("small-sided game" OR “small-sided games” OR "SSG" OR “SSGs” OR "conditioned game" OR “conditioned games” OR "reduced game" OR “reduced games” OR "modified game" OR “modified games” OR “sided-game” OR “sided-games” OR “medium-sided game” OR “medium-sided games” OR “large-sided game” OR “large-sided games” OR “constrained game” OR “constrained games”)

AND

[Title/Abstract] ("training regimen" OR "continuous" OR "intermittent" OR "work-to-rest ratio" OR "interval" OR "training format" OR “fractionated” OR “recovery” OR rest)

2.3.Selection of sources of evidence

All records identified through the database and supplementary searches were exported into Endnote online software, and duplicates were removed prior to screening. The selection of sources of evidence was performed in two stages. First, titles and abstracts were independently screened by two authors (FMC and DM) against the eligibility criteria. Second, the full texts of potentially relevant articles were retrieved and assessed in detail for final inclusion. Any disagreements between authors at either stage were resolved through discussion, and when consensus could not be reached, a third author acted as arbiter (RT).

The entire selection process was documented in accordance with the PRISMA-ScR flow diagram, reporting the number of records identified, screened, excluded (with

reasons), and included in the final synthesis. Reasons for exclusion at the full-text stage were systematically recorded.

2.4.Data charting process

Data from the included sources of evidence were charted using a standardized extraction form developed a priori in line with the objectives of this review. The form was designed iteratively: an initial version was piloted independently by two authors (FMC and DM) on a random sample of five studies. Based on this pilot phase, adjustments were made to refine the definitions of data items and to harmonize the charting procedure.

Following piloting, two authors (FMC and DM) independently charted data from all included studies. Extracted information covered bibliographic details (author, year), study characteristics (design, sample size, sex and competitive level of participants), details of the SSG training regimen (continuous, intermittent, or intermittent with varying work-to-rest ratios), session parameters (duration, frequency, total intervention period), and SSGs design (e.g., format of play, pitch dimensions, task objectives and other task conditions).

Any discrepancies in data extraction between authors were resolved through discussion. When important information was missing or unclear, attempts were made to contact study authors to obtain additional details through email and ResearchGate platform.

2.5.Data items

Outcome measures were grouped into four categories aligned with the objectives of this review. Physical outcomes included external load indicators such as total distance covered at different speed thresholds, accelerations and decelerations or combined external load parameters (e.g., player load; metabolic power). Psychophysiological

outcomes included HR, RPE, internal training load indices (e.g., Training Impulse), and hormonal or metabolic markers. Technical outcomes included variables such as passing frequency and accuracy, number of ball possessions, shots, and other technical actions recorded. Tactical outcomes included measures derived from notational or positional analysis such as team dispersion, synchronization, player interactions, and spatial–temporal patterns.

2.6.Synthesis of results

Data were organized into evidence tables that mapped the extent, range, and nature of the literature examining different training regimens in SSGs. Studies were grouped according to the format of play (continuous, intermittent, or intermittent with varying work-to-rest ratios) to allow comparisons across training regimens. Within each category, findings were further classified according to outcome domains: physical, psychophysiological, technical, and tactical.

Given the heterogeneity of study designs, participant characteristics, intervention parameters, and outcome measures, no attempt was made to conduct a quantitative synthesis. Instead, patterns of evidence were summarized narratively, highlighting convergent findings, conflicting results, and areas of insufficient evidence. Particular attention was paid to identifying how variations in training regimen influenced responses across outcome domains, as well as to noting methodological gaps. The synthesis also incorporated visual mapping of evidence through figures and tables, which were used to illustrate the distribution of studies across regimens, outcomes, and populations.

3. Results

3.1.Selection of sources of evidence

A total of 2,018 records were identified through database searches (PubMed, n = 406; Scopus, n = 843; Web of Science, n = 769). After removal of 948 duplicates, 1,070 records remained for screening. Of these, 1,035 were excluded based on title and abstract. Thirty-five full-text reports were retrieved and assessed for eligibility, with none being unobtainable. Following assessment, six studies [18–23] were excluded because they did not include comparisons between training regimens. Ultimately, 29 studies met the inclusion criteria and were incorporated into the review (Figure 1).

Figure 1

3.2.Characteristics of sources of evidence

Across the 29 studies synthesized in table 1, most comparisons have focused on continuous versus intermittent SSG formats [8,12,24–27]. Intermittent vs. intermittent comparisons manipulating bout duration have also been common [11,18,28]. Comparisons were also made between different recovery times and workout density emerged as a common point of evaluation [29,30]. Psychophysiological outcomes, especially heart rate, RPE, and lactate, are the most consistently reported across the literature [8,31], whereas technical actions have been scarcely quantified [24,26].

Table 1

The evidence gap map (Figure 2) highlights this imbalance, showing dense coverage in the physical and psychophysiological domains but considerably fewer studies addressing technical or tactical outcomes. Actually, tactical measures of collective behavior remain almost absent. Moreover, although work has begun exploring metabolic stress markers such as acid–base balance in high-intensity 1v1 SSGs [32,33] and mood-related outcomes [34], these remain underrepresented in the broader dataset.

Figure 2

Analysis of study designs by format of play showed that most evidence has accumulated in 3v3, 4v4, and 5v5 SSGs, particularly when comparing continuous and intermittent regimens (Figure 3). For example, nine studies contrasted continuous and intermittent structures in 4v4 formats, while seven and four studies did so in 3v3 and 5v5 respectively. In contrast, evidence for larger formats (6v6, 7v7) or very small-sided designs (1v1, 2v2) remains sparse, with only isolated comparisons reported. Intermittent–intermittent contrasts (longer vs. shorter bouts or longer vs. shorter recovery) have been studied in 3v3 to 5v5 formats but are virtually absent in 6v6 and 7v7.

Figure 3

3.3.Results of individual sources of evidence

Comparisons between continuous and intermittent regimens consistently indicate that intermittent formats tend to elicit greater distances covered at high speeds and more accelerations, while continuous play sustains higher cumulative workloads [8,24,35]. When manipulating bout duration, shorter repetitions (e.g., 6×2 min) generally produced higher movement intensity per minute than longer continuous formats [9,18], although total volumes tended to be lower. Work-to-rest ratio was also a critical determinant: longer recoveries allowed greater high-intensity outputs, whereas shorter rests constrained physical performance [30,36,37]. The findings summarized in Table 2 suggest that bout structure can modulate external load demands in SSGs.

Table 2

Across formats, continuous regimens generally produced higher mean HR and RPE, reflecting greater cardiovascular and perceptual strain compared to intermittent play [35,38,39]. Conversely, intermittent regimens often elicited similar or higher HR peaks but lower sessional RPE, suggesting more fluctuating but tolerable physiological loading [8,27,40]. Manipulating bout and rest durations yielded consistent patterns: shorter work-to-rest ratios increased lactate and RPE [30,31], whereas longer recoveries attenuated internal load and improved metabolic recovery [29,36,37]. Some recent studies expanded into hormonal [41] and mood-related markers [34]. Table 3 presents the main findings showing how different bout and recovery structures distinctly shape cardiovascular, metabolic, and perceptual demands in SSG training.

Table 3

Continuous regimen often favored passing accuracy and ball retention, while intermittent regimens tended to increase the number of duels, tackles, and goal-scoring opportunities [26,34,38]. Sex-specific responses were also observed, with females performing better technically under intermittent formats, while males tended to benefit more from continuous play [39]. Rest duration appeared decisive, as very short recoveries reduced passing success, whereas longer rests allowed better execution of ball actions [30,37]. Overall, as detailed in Table 4, technical outcomes seem to be sensitive to regimen design.

Table 4

4. Discussion

Most studies contrasted continuous and intermittent regimens, particularly in relation to psychophysiological responses, followed by explorations of intermittent formats with differing bout durations. By contrast, fewer studies examined work-to-rest manipulations, and none provided quantitative assessments of tactical behavior. The majority of evidence clustered around 3v3–5v5 formats, with 4v4 emerging as the most studied, whereas 1v1–2v2 formats and 6v6–7v7 formats were scarcely explored. Manipulations of bout duration suggested that shorter repetitions may help maintain per-minute intensity but at the expense of total volume, whereas longer rest periods appeared to facilitate greater physical output and occasionally more accurate technical execution. Findings relating to technical actions were fewer and mixed, and tactical outcomes remain absent from the comparative evidence base.

4.1.Continuous vs. intermittent regimens

Across the studies that directly contrasted continuous with intermittent SSG, intermittent formats often showed higher external intensity (e.g., more high-intensity running/sprints or greater distance per minute), whereas continuous formats more often sustained steadier workloads, although effects were context-dependent. Intermittent formats were more intense than continuous for high-intensity running and sprint actions in youth 2v2–6v6 [35], produced slightly greater total distance than continuous in 5v5 possession [8], and maintained higher external outputs when very short work bouts were used (e.g., 6×3 vs 3×6 in 5v5; [9,11]). In applied contexts, "intensive" microcycle SSGs (shorter bouts/blocks) sometimes delivered less running volume than "extensive" (longer bouts) but altered the load profile [42]. In 6v6, however, continuous, 2×4, and 4×2 showed no clear differences in external load [26].

On the psychophysiological analysis, continuous regimens frequently elicited higher mean HR and RPE than intermittent [26,35,38,43], while intermittent formats sometimes showed higher HR peaks but lower sessional RPE or more fluctuating intensity [8,27,40]. Longer continuous bouts were often perceived harder than fractionated equivalents even when external loads were similar [26], and "intensive" sessions to higher sRPE/ITL vs "extensive" [42]. Over weeks, intermittent SSG improved anaerobic power more than continuous SSG while continuous carried higher perceived load [27,44].

Intermittent formats increased shots/goals vs continuous in 6v6 [26], yet continuous play was associated with better passing accuracy and lower ball loss in 3v3–4v4 formats [34,38]. Comparisons between sexes suggested females performed technically better under intermittent, whereas males tended to benefit under continuous [39].

4.2.Shorter vs. longer intermittent workout periods

When work duration within intermittent SSGs was manipulated while keeping recovery relatively constant, shorter bouts tended to maintain higher external intensity. In 5v5 training, six 3-min bouts elicited more total distance, running distance, and accelerations/decelerations compared to three 6-min bouts [9,11]. Similarly, in youth players, shorter repetitions (6×2 min) increased distance per minute and moderate-intensity running compared with longer sets (2×6 min), while long-bout conditions maintained higher total volumes [43]. In 1v1 format, 30-s work intervals produced greater relative distances and higher maximal velocities than 45-s intervals, though overall work output was reduced [32,33]. Yet, not all comparisons revealed differences. In 6v6 format, intermittent formats of varying bout length (8 min, 2×4 min, 4×2 min) showed no clear differences in total distance, high-speed running, or accelerations [26].

In 5v5 with goalkeepers, three 6-min bouts resulted in higher RPE values than six 3-min bouts, even though mean heart rate did not differ significantly [9,11]. Similar results were observed in 4v4, where 3×6-min formats produced higher mean and peak HR compared to 6×3-min [28]. Lactate responses also tended to rise more in long-bout formats [43]. On the technical side, shorter bouts have been associated with greater frequency of individual actions and more stable execution [24], whereas longer bouts can impair technical accuracy under fatigue, with higher rates of passing errors or ball losses [34,38].

4.3.Shorter vs. longer rest periods

When recovery duration between intermittent SSG bouts was manipulated, longer rests generally allowed players to sustain or increase high-intensity outputs, whereas shorter rests tended to constrain external load. In 3v3 play, 3-min rests increased total distance and high-intensity running, while 4-min rests promoted more moderate-intensity activity compared with shorter pauses [30]. Similarly, in 4v4 formats, extending rest to 4 min produced more accelerations and decelerations compared to 1-min recovery, although total distance, high-speed running, and maximal velocity were unaffected [29]. By contrast, in 6v6 format, varying recovery from 30 s to 120 s between 2-min bouts did not significantly alter total distances or speed zones, suggesting that players may adapt pacing strategies when rest windows are relatively short [36,37].

Shorter rests consistently increased cardiovascular and metabolic stress**,** whereas longer rests attenuated these responses. In 3v3, 1-min rest produced higher %HRmax, greater blood lactate, and higher RPE compared with 2–4 min pauses [30]. In 4v4, 2-min recovery was associated with higher RPE than 1-min, while 4-min did not further increase perceived exertion [29]. In 6v6, HR during exercise was similar between 30-s and 120-s rest, but recovery HR was significantly lower with the longer pause [36,37]. Regarding technical outcomes, evidence is limited but suggests that very short rests may impair execution. In 3v3 formats, 1-min recovery was linked to reduced successful passes, while 4-min rests increased passing success and 3-min rests favored tackles and ball touches [30]. McLean et al. [37] also noted that 120-s rests supported more successful tackles compared with 30-s intervals.

4.4.Limitations and future research

This scoping review has some limitations. The heterogeneity in reporting formats limited the ability to synthesize results beyond descriptive mapping. Regarding the

included studies, common limitations were evident: small and often homogeneous samples (mostly male, youth, or sub-elite players), short intervention periods, and diverse measurement tools. Many studies also relied on isolated sessions rather than longitudinal designs, and only a minority reported reliability of outcome measures. To advance this research topic, future studies should prioritize larger and more diverse samples, including female or elite players. Longer intervention studies are needed to move beyond acute responses and better capture adaptation. Importantly, objective analyses of technical and tactical behaviors using tracking systems and video-based performance analytics are critical to filling the most evident evidence gap. Finally, clearer descriptions of training regimens (e.g., pitch size per player, rest mode, rules, task goals) and replicability conditions would help establish findings that can better guide practice.

5. Conclusions

This scoping review indicates that research on SSG training regimens has been most consistent in documenting physical and psychophysiological responses, with evidence suggesting that intermittent formats often increase high-intensity actions and metabolic fluctuations, while continuous play tends to sustain higher cardiovascular and perceptual strain. Findings on technical outcomes are fewer and heterogeneous, with some signals that continuous formats may favor accuracy and possession, whereas intermittent play increases involvement in actions. Importantly, no studies provided objective quantification of tactical behaviors, highlighting a major evidence gap. From a methodological standpoint, the available literature is limited by small samples, heterogeneous protocols, short intervention durations, and a predominant focus on male youth or sub-elite players. Future research should prioritize standardized outcome measures, include female and elite populations, and integrate objective tactical analyses

using tracking technologies or observational tools. More longitudinal is also needed to clarify how specific bout structures contribute to skill acquisition, physiological adaptation, and tactical improvement over time.

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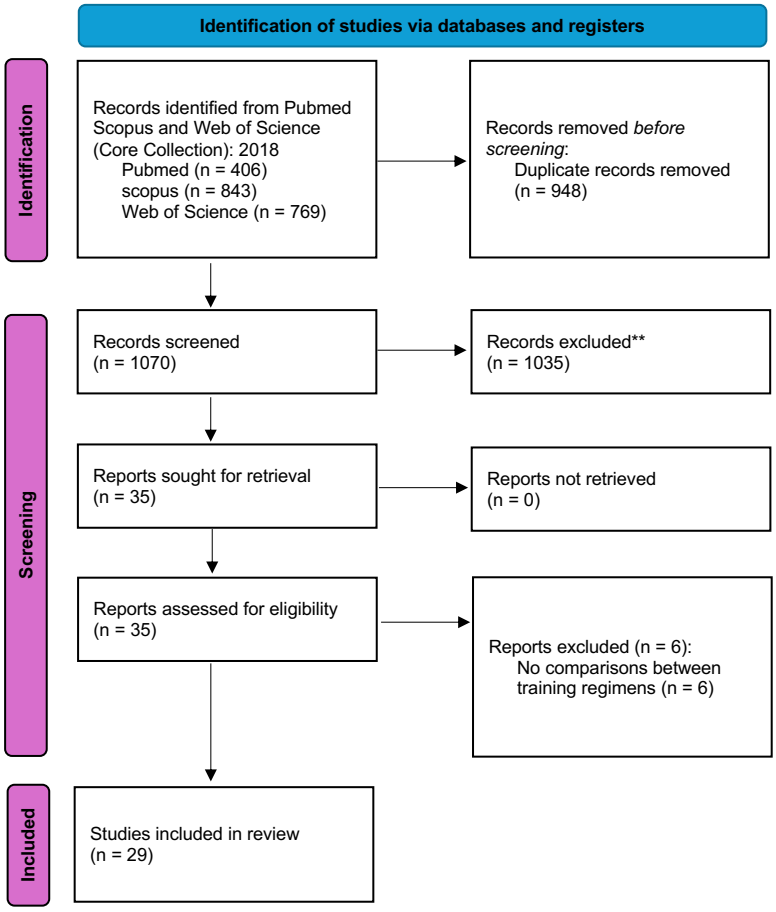
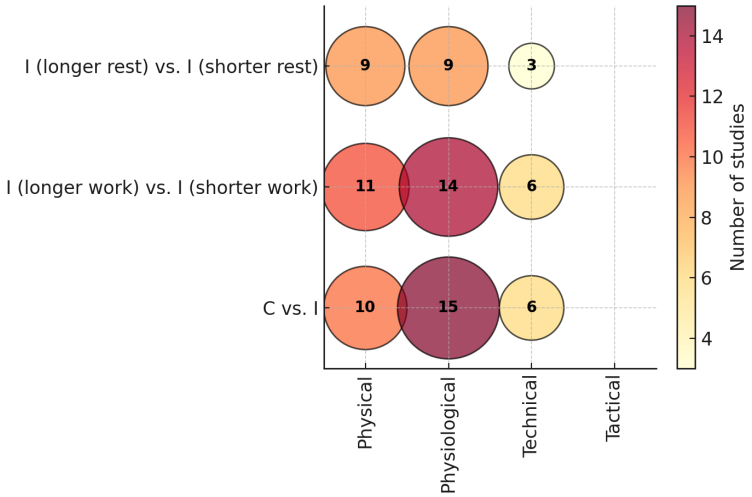


Figure 1. PRISMA flowchart [45].



Comentado [DCA2]: I think better to indicate "psychophysiological" instead of "physsiological""

Figure 2. Evidence gap map considering the type of training regimen comparisons and the outcomes analyzed. I: intermittent regimen; C: continuous regimen.

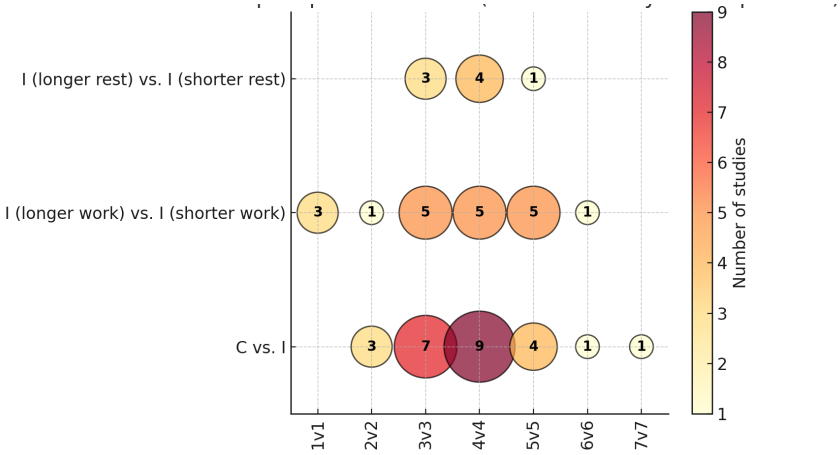


Figure 3. Evidence gap map considering the type of training regimen comparisons and the formats employed. I: intermittent regimen; C: continuous regimen.

Table 1. Characteristics of the included studies.

Study	Sex	Competitive Level	N	Age	Format	Pitch Dimensions (L × W, m)	Task Goal and rules	Continuous Regimen	Intermittent Regimens (sets × reps × work × rest; rest mode)	Outcomes – Physical	Outcomes – Psychophysiological	Outcomes – Technical	Outcomes – Tactical
Alcântara et al. [24]	Male	Sub-elite (U-14, Brazilian professional club academy)	11	13.0 ± 0.8 yrs	3v3 and 5v5 (both with GK)	3v3: 37×24; 5v5: 48×31	Regular goals with GK	1×20 min	2×10 min (rest 300s, passive); 4×5 min (rest 150s, passive). All ≈2:1 work-to-rest ratio	Total distance, high-intensity running (13–18 km/h), sprinting (>18 km/h), distance >80% PST-CAR	RPE (CR-10)	Successful/unsuccessful passes, ball contacts, ball involvement, goals, shots (on/off target)	None reported
Branquinho et al. [25]	Male	Professional (Portuguese, senior)	20	25.2 ± 6.1 yrs	5v5 (no offside)	40 × 40	Regular goals with GK	1 × 24 min	2 × 12 min (2-min passive rest); 4 × 6 min (2-min passive rest); 6 × 4 min (2-min passive rest)	Total distance, displacement at very low, low, moderate, and high/very high speeds; maximum speed	HR (Max HR, Average HR)	None	None
Branquinho et al. [12]	Male	Semiprofessional (Portuguese, senior)	20	23.9 ± 2.1 yrs	5v5 (with GK)	40 × 40	Regular goals with GK	1 × 18 min	3 × 6 min with 30s rest (passive); 3 × 6 min with 1-min rest; 3 × 6 min with 1.5-min rest; 3 × 6 min with 2-min rest	Total distance, distance in moderate, high, very high, and max intensity zones; maximum speed	HR (Max HR, Average HR)	None	None
Casamichana et al. [8]	Male	Semiprofessional (Spanish, 3rd Division)	10	21.3 ± 3.4 yrs	5v5 (no GK)	55 × 38	Ball possession	1 × 16 min	2 × 8 min (2-min passive rest); 4 × 4 min (1-min passive rest)	Total distance, distance in speed zones (0–6.9, 7–12.9, 13–17.9, 18–20.9, >21 km/h); accelerations; PlayerLoad	HR (mean, %HRmax, time in HR zones)	None	None
Chmura et al. [41]	Male	Elite youth (U-18, Polish First Division academy)	18 (E1:10, E2:8)	17.2 ± 0.9 yrs	1v1	15 × 10	Regular goals (with boards, 1v1 duels)	None	E1: 6 × 30s × 2 min passive rest; E2: 6 × 45s × 3 min passive rest	None	Blood hormones: total testosterone (TT), free testosterone (FT), cortisol (C); T/C and FT/C ratios	None	None
Christopher et al. [26]	Male	Elite youth (U16, Category 1 English academy – Chelsea FC)	12	15.8 ± 0.6 yrs	6v6 (with GK)	50 × 32	Regular goals with GK	1 × 8 min	2 × 4 min (1-min passive rest); 4 × 2 min (45–60 s passive rest)	Total distance, low/moderate/high-speed running (>17 km/h), accelerations (>2 m/s²), decelerations (<–2 m/s²)	HR (mean, %HRmax, time >85%HRmax), RPE (CR-10)	Passes, successful passes, unsuccessful passes, shots, shots on target, goals, possessions, regains	None

Clemente et al. [9]	Male	Amateur (regional-level Portuguese)	10	23.7 ± 1.1 yrs	5v5 (no GK, small goals)	42 × 22	Mini-goals (2 × 1 m), no GK	None	6 × 3 min (2-min passive rest); 3 × 6 min (2-min passive rest)	Total distance (m/min), running distance (14–19.9 km/h), sprinting distance (>20 km/h), accelerations >2 m/s², decelerations >2 m/s², PlayerLoad	HRmean, RPE (CR-10)	None	None
Clemente et al. [11]	Male	Amateur (Portuguese regional-level)	10	19.8 ± 1.6 yrs	5v5 (no GK)	30 × 30	Mini-goals (2 × 1 m)	None	6 × 3 min (2-min passive rest); 3 × 6 min (2-min passive rest)	Total distance (m/min), running distance (14–19.9 km/h), sprinting distance (>20 km/h)	HRmean, RPE (CR-10)	None	None
Daryanoosh et al. [27]	Male	Sub-elite (Iranian Youth League, U19)	16 (8 CSSG, 8 ISSG)	19.5 ± 0.5 yrs	4v4	40 × 20	Ball possession (touch limit = 2; turnovers and 10 passes = 1 point)	25–40 min continuous play (progression: 25 → 40 min across 8 weeks)	5–8 × 5 min with 1-min passive rest (progression: 25 → 40 min total across 8 weeks)	None	HRmean, HRmax, RPE (Borg 6–20)	None	None
Dios-Álvarez et al. [29]	Male	Semi-professional (Spanish 3rd Division)	16	24.8 ± 6.8 yrs	4v4 + GK	30 × 25	Regular goals with GK	None	4 × 4 min bouts; recovery durations: 1 min, 2 min, 4 min (passive)	Total distance, distances by intensity (walking, low, medium, high, sprint), max speed, accelerations, decelerations, PlayerLoad, power score, HMP	RPE (Foster 0–10)	None	None
Esqueda et al. [28]	Male	Elite youth (U17, professional academy, Mexico)	8	16.3 ± 0.5 yrs	4v4 + GK	24 × 17	Regular goals with GK	None	LB: 3 × 6 min (2-min passive rest); SB: 6 × 3 min (2-min passive rest)	Total distance, distance in intensity zones (<12, 13–17.9, >18 km/h), explosive distance (>1.2 m/s²), accelerations >2 m/s², decelerations <–2 m/s², PlayerLoad	HRpeak, HRmean	None	None
Farhani et al. [38]	Male	Semi-professional (Tunisian national league, high-level)	16	20.7 ± 0.7 yrs	3v3 and 4v4 (with GK)	3v3: 20 × 30; 4v4: 25 × 32	Regular goals with GK	1 × 12 min	2 × 6 min (2-min passive rest); 3 × 4 min (2-min passive rest)	None	%HRpeak, HRpeak, blood lactate, RPE (CR-10), Physical Activity Enjoyment Scale (PACES)	Successful passes, tackles, duels, ball losses (%)	None
Farhani et al. [39]	Male & Female	High-level national league (Tunisia)	32 (16M, 16F)	M: 20.7 ± 0.7 yrs; F: 20.1 ± 0.5 yrs	4v4 + GK	25 × 32	Regular goals with GK	1 × 12 min	2 × 6 min (2-min passive rest); 3 × 4 min (2-min passive rest)	None	%HRpeak, HRpeak, blood lactate, RPE (CR-10),	Successful passes, tackles, duels, ball losses (%)	None

										Physical Activity Enjoyment Scale (PACES)		
Farhani et al. [34]	Male	Semiprofessional (Tunisian national league, high-level)	16	20.7 ± 0.7 yrs	3v3 and 4v4 + GK	3v3: 30 × 20; 4v4: 25 × 32	Regular goals with GK	1 × 12 min	2 × 6 min (2-min passive rest); 3 × 4 min (2-min passive rest)	None	Mood state (POMS: TMD, fatigue, depression, anger, tension, confusion, vigor)	Successful passes (%), successful tackles (%), successful duels (%), ball losses (%)	None
Hidalgo-de Mora et al. [46]	Male	Sub-elite (U18, British Local League Division)	14	17.1 ± 0.6 yrs	7v7 + GK	LSG: 68 × 40 (194 m²/player); SSG: 40 × 34 (97 m²/player)	Regular goals with GK	3 × 8 min with 5-min passive rest (large pitch, LSG8)	6 × 4 min with 2-min passive rest (large pitch, LSG4); 6 × 4 min with 2-min passive rest (small pitch, SSG4)	Total distance, low-intensity running, high-intensity running, very high-intensity running, sprinting distance, mean velocity, max velocity, accelerations, decelerations	None	Kick velocity (KV)	None
Hill-Haas et al. [35]	Male	Elite youth (U18, Australian top domestic competition)	16	16.2 ± 0.2 yrs	2v2, 4v4, 6v6	2v2: 28×21; 4v4: 40×30; 6v6: 49×37	Regular goals (not specified GK)	1 × 24 min	4 × 6 min (1.5-min passive rest)	Total distance, distance in speed zones (0–6.9; 7–12.9; 13–17.9; >18 km/h), sprints, sprint activity ratio	HR (every 5s, %HRmax, time in HR zones), blood lactate, RPE (6–20 Borg)	None	None
Ispirlidis et al. [47]	Male	Semi-professional (Greek regional league)	8	21.5 ± 0.3 yrs	4v4	40 × 30	Possession (score a goal after 6 passes, man-to-man marking, no goalposts)	Con: 2 × 8 min (3-min rest)	Int-I: 4 × 4 min (3-min passive rest); Int-II: 4 × 4 min sets (each set = 1 min work + 10, 20, 30 s recovery, +1 min work; 3-min passive rest between sets)	Total distance, distance in speed zones (3–6.99, 7–10.99, 11–14.99, 15–18.99, >19 km/h), accelerations (>3 m/s²), decelerations (<–3 m/s²)	HRmean (%HRmax), time in HR zones, RPE (Borg 1–10), sRPE	None	None
Köklü [7]	Male	Elite youth (U17, Turkish academy league)	20	16.6 ± 0.5 yrs	2v2, 3v3, 4v4 (no GK)	2v2: 15×20; 3v3: 18×24; 4v4: 24×36	Free play with coach encouragement, no GK	2v2: 1×6 min; 3v3: 1×9 min; 4v4: 1×12 min	2v2: 3×2 min (2-min passive rest); 3v3: 3×3 min (2-min passive rest); 4v4: 3×4 min (2-min passive rest)	None	HRmean, %HRmax, blood lactate	None	None
Köklü et al. [30]	Male	Elite youth (U15, Turkish academy league)	12	15.4 ± 0.5 yrs	3v3 (no GK)	18 × 30 (90 m²/player)	Ball possession (keep ball in play as long as possible; no GK, coach	None	4 × 4 min bouts; recovery durations: 1 min (R1), 2 min (R2), 3 min (R3), 4 min (R4) (all passive)	Total distance, distance in speed zones (walking, LIR, MIR, HIR >18 km/h)	%HRmax, %HRreserve, blood lactate, RPE (CR-10)	Touches of the ball, total passes, successful passes, passes received, tackles	None

						encouragement, spare balls)							
Köklü et al. [43]	Male	Elite youth (U17, Turkish academy league)	15	17 ± 1 yrs	2v2, 3v3, 4v4 (no GK)	2v2: 16×25; 3v3: 20×30; 4v4: 25×32	Ball possession (maintain possession, coach encouragement, spare balls, no GK)	1 × 12 min (CON)	SBD: 6 × 2 min (1-min passive rest, 1:1 ratio); MBD: 3 × 4 min (2-min passive rest, 2:1); LBD: 2 × 6 min (3-min passive rest, 3:1)	Total distance, distance in speed zones (walking, LIR, MIR, HIR), max speed	%HRmax, blood lactate, RPE (CR-10)	None	None
Kryściak et al. [32]	Male	Elite youth (U18, Polish 1st division academy)	20 (E1=10; E2=10)	17.2 ± 0.9 yrs	1v1	15 × 10	Small goals, no GK, coach-fed balls to maintain tempo	None	E1: 6 × 30 s (120-s passive rest, 1:4 ratio); E2: 6 × 45 s (180-s passive rest, 1:4 ratio)	Total distance, distance per min, player load, player load per min, Vmax	%HRmax, blood lactate, pH, bicarbonate (HCO_3^-), base excess (BE)	None	None
Kryściak et al. [33]	Male	Elite youth (U18, Polish 1st division academy)	20 (SEP1=10, SEP2=10)	17.2 ± 0.8 yrs	1v1	10 × 15	Small goals, no GK, continuous ball supply by coach	None	SEP1: 6 × 30 s (120-s passive rest, 1:4 ratio); SEP2: 6 × 45 s (180-s passive rest, 1:4 ratio)	TD, Player Load, accelerations (>2 m/s²), decelerations (>2 m/s²), all also expressed per min; max velocity	None	None	None
McLean et al. [36]	Male	Sub-elite (Australian 2nd tier league, experienced players)	12	21.3 ± 2.9 yrs	3v3	15 × 20	Ball possession (no goals, no GK, unlimited touches, no coach encouragement)	None	6 × 2 min; recovery durations: 30 s (REC-30, passive walking) vs 120 s (REC-120, passive walking)	Total distance, distance in speed zones (0–6.9, 7–12.9, 13–17.9, >18 km/h)	Vastus lateralis oxygenation (HHb, O_2Hb, tHb, via NIRS), HRmean, HRpeak, RPE (CR-10)	None	None
McLean et al. [37]	Male	Semi-professional (2nd tier, Australia)	12	21 ± 3 yrs	3v3	15 × 20	Ball possession (no goals/GK, unlimited touches, no coach encouragement)	None	6 × 2 min bouts; 30 s recovery (REC-30, passive walking) vs 120 s recovery (REC-120, passive walking)	Distance, speed zones (via TMD, GPS)	HR, RPE (CR-10)	16 TS variables: total passes, successful passes, first-touch passes, passes received, time in possession, individual touches, successful tackles, etc.	None
Mulazimoglu & Kartoglan [40]	Male	University-level, sub-elite (Turkey)	12	20.8 ± 1.6 yrs	3v3	34 × 26	Free play, spare balls, no GK	1 × 12 min	3 × 4 min (2-min passive rest, ~1:½ work:rest ratio)	Total distance, distance per min, sprint distance, max speed, PlayerLoad	HR (mean, %HRmax, time in 5 zones), RPE not reported	None	None

Nagy et al. [31]	Male	Elite youth (U15, Slovak 1st Division, DAC 1904)	8	14.5 ± 0.5 yrs	4v4 + GK	30 × 20	Regular goals with GK	None	SSG1: 4 × 2 min with 4-min active rest (1:2); SSG2: 4 × 2 min with 2-min active rest (1:1); SSG3: 4 × 2 min with 1-min active rest (1:0.5)	None	HRmin, HRmean, HRmax, time in HR zones, % time > anaerobic threshold	None	None
Pancar et al. [44]	Male	Youth (domestic Turkish club, pre-season)	16 (8 ISSG, 8 CSSG)	ISSG: 16.50 ± 0.53 yrs; CSSG: 16.63 ± 0.52 yrs	4v4	25 × 32	Ball possession (2-touch rule, no GK, spare balls for continuity)	CSSG: 1 × 16 min (wk2) → 1 × 28 min (wk5), continuous play	ISSG: 4 × 4 min (wk2) → 4 × 7 min (wk5); 2-min passive rest seated/standing between bouts	None	RPE (CR-10 Borg, sessional), BMI	None	None
Sánchez-Sánchez et al. [48]	Male	Junior players (Spanish regional-level team)	12	17.2 ± 0.44 yrs	4v4 + GK	40 × 30 (150 m²/player)	Regular goals with GK; external wildcard used	None	Fixed recovery: 2-min play, 2-min rest (BF, EF); Variable recovery: play until goal scored or 2-min max (BV, EV); order manipulated (beginning vs end of session)	Total distance, relative distance (m/min), distance in speed zones (0–0.4, 0.5–3, 3.1–8, 8.1–13, 13.1–18, >18 km/h), HID (>13 km/h), max speed	None	None	None
Zanetti et al. [42]	Male	Elite U20 (Brazilian 1st Division, Red Bull Brazil)	18	19 ± 1.0 yrs	Multiple: 3v1, 3v3, 5v5v5, 5v4, 7v7v7, 10v9 (with GK)	Ranged: 15×15 (3v1) to 40×55 (7v7v7, 10v9)	Regular goals with GK, possession, transition, goal attempts	Extensive: longer bouts (e.g., 1×20 min, 1×25 min, 1×30 min, 6×3 min, etc.)	Intensive: shorter bouts, more sets (e.g., 2×30 s, 5×3 min, 6×3 min, 3×8 min, etc.), rest intervals 30 s–3 min	Total distance (TDR), high-speed running (>20 km/h), accelerations (>2 m/s²), decelerations (<–2 m/s²), all per min	Session-RPE (CR-10), internal training load (ITL = RPE × duration)	None	None

CC: Accelerations; AU: Arbitrary Units; BE: Base Excess; BMI: Body Mass Index; CAR: Carminatti's Test Peak Speed; CB: Continuous Bout; CMJ: Countermovement Jump; CON: Continuous Regimen; CSSG: Continuous Small-Sided Game; DEC: Decelerations; ETL: External Training Load; EV: End of session + Variable recovery; FT: Free Testosterone; GK: Goalkeeper; HCO_3^-: Bicarbonate; HID: High-Intensity Distance; HHb: Deoxyhemoglobin; HIR: High-Intensity Running; HR: Heart Rate; HRmax: Maximal Heart Rate; HRmean: Mean Heart Rate; HRmin: Minimum Heart Rate; HRpeak: Peak Heart Rate; HSR: High-Speed Running; ITL: Internal Training Load; ISSG: Intermittent Small-Sided Game; KV: Kick Velocity; LB: Long Bout; LBD: Long Bout Duration; LSG: Large-Sided Game; MBD: Medium Bout Duration; MIB: Medium Intermittent Bout; MIR: Moderate-Intensity Running; NIRS: Near-Infrared Spectroscopy; O_2Hb: Oxyhemoglobin; PACES: Physical Activity Enjoyment Scale; PL: PlayerLoad; POMS: Profile of Mood States; PST-CAR: Peak Speed from Carminatti's Intermittent Running Test; RAST: Running-based Anaerobic Sprint Test; RD: Relative Distance; REC-30 / REC-120: Recovery conditions with 30 s or 120 s rest; RPE: Rating of Perceived Exertion; sRPE: Session Rating of Perceived Exertion; SB: Short Bout; SBD: Short Bout Duration; SEP: Special Endurance Protocol; SSGc: Continuous Small-Sided Game; SSGi: Intermittent Small-Sided Game; TD: Total Distance; TDR: Total Distance Running; T/C: Testosterone to Cortisol ratio; tHb: Total Hemoglobin; TMD: Time–Motion Data (or Total Mood Disturbance, context-dependent); TT: Total Testosterone; VHIR: Very High-Intensity Running; Vmax: Maximal Velocity

Table 2. Main findings for physical outcomes.

Study	Comparison tested	Outcome(s)	Main findings
Alcântara et al. [24]	Shorter vs longer bouts; 3v3 vs 5v5	TD, >80% PST-CAR	Shorter bouts ↑ TD and >80% PST-CAR (sig); 3v3 > 5v5 for actions per player (sig).
Branquinho et al. [25]	Continuous 1×24 vs 2×12 vs 4×6 vs 6×4	TD + speed zones	Fractionated formats ↑ TD (esp. low–moderate speeds) vs continuous (sig).
Branquinho et al. [12]	3×6 with 0.5, 1, 1.5, 2-min rests	TD, Vmax	Longer rests (1.5–2 min) ↑ TD & Vmax vs 0.5–1 min (sig).
Casamichana et al. [8]	Con 1×16 vs 2×8 vs 4×4	TD, PlayerLoad	Intermittent ↑ TD (small; sig/MBI), continuous ↑ PlayerLoad (sig).
Christopher et al. [26]	1×8 vs 2×4 vs 4×2	TD, HSR, ACC/DEC	No differences across formats (ns).
Clemente et al. [9]	6×3 vs 3×6	TD, running, ACC/DEC	6×3 > 3×6 for TD, running, ACC/DEC (MBI: almost certainly/very likely).
Clemente et al. [11]	6×3 vs 3×6	TD, running, sprint	6×3 > 3×6 for TD & running (sig); sprinting ns.
Dios-Álvarez et al. [29]	1 vs 2 vs 4-min rest (4×4+GK)	ACC/DEC, TD/HSR, Vmax	4-min rest ↑ ACC/DEC vs 1-min (sig); TD/HSR/Vmax ns.
Esqueda et al. [28]	3×6 vs 6×3 (4v4+GK)	TD, low-int, explosive, ACC/DEC	3×6 > 6×3 for all listed metrics (sig).
Hidalgo-de Mora et al. [46]	LSG8 vs LSG4 vs SSG4	TD, HIR/VHIR, sprint, Vmax	Larger pitch + short bouts (LSG4) ↑ TD/HIR/VHIR/sprint/Vmax vs others (sig).
Hill-Haas et al. [35]	Con 1×24 vs Int 4×6	HIR (≥13 & >18 km·h^{-1}), sprints	Intermittent > continuous for HIR & sprints (sig).
Ispirlidis et al. [47]	Con (2×8) vs Int-I (4×4) vs Int-II (4×[1′ work + micro-rests])	TD, HSR	Int-II > Int-I > Con for TD & HSR (sig).
Köklü et al. [30]	3v3 with 1, 2, 3, 4-min rest	TD, MIR, HIR	3-min rest ↑ TD & HIR (sig); 4-min ↑ MIR (sig) vs shorter rests.
Köklü et al. [43]	CON 1×12 vs SBD 6×2 vs MBD 3×4 vs LBD 2×6	TD, MIR, HIR, Vmax	SBD > LBD/CON for TD & MIR (sig); HIR largely ns; some Vmax advantages for SBD (sig, 2v2).
Kryściak et al. [32]	1v1: 6×30″(1:4) vs 6×45″(1:4)	TD·min^{-1}, Vmax	30″ > 45″ for TD·min^{-1} & Vmax (sig); but lower total volume (sig).
Kryściak et al. [33]	same formats across 6 reps	TD/PL/ACC/DEC (per rep)	All ↓ across reps (sig); sharper drops with 30″ vs 45″ (sig).
McLean et al. [36]	6×2 with 30 s vs 120 s rest	Distance & speed zones	No between-condition differences (ns).
McLean et al. [37]	6×2 with 30 s vs 120 s rest	GPS TMD	No differences (ns).
Mulazimoglu & Kartoglan [40]	Con 1×12 vs Int 3×4	PL, TD, sprint	Int > Con for PlayerLoad (sig); TD/sprint/Vmax ns.
Sánchez-Sánchez et al. [48]	Begin vs End; Fixed vs Variable recovery	TD, HID, Vmax	Begin > End for TD/HID (sig); Variable > Fixed for Vmax (sig).
Zanetti et al. [42]	"Extensive" vs "Intensive" sessions	TDR, HSR	Extensive > Intensive for TDR & HSR (ES>0.8; sig CLs).

TD: total distance; TDR: total distance running; PST-CAR: peak speed from Carminatti's intermittent running test; HSR: high-speed running (study-specific threshold, commonly ≥17–20 km·h^{-1}); HIR: high-intensity running (study-specific, often ≥18 km·h^{-1}); VHIR: very high-intensity running; MIR: moderate-intensity running; ACC: accelerations; DEC: decelerations; Vmax: maximal velocity; PL (PlayerLoad): accelerometer-derived composite workload; TMD (GPS): time–motion data (GPS-derived movement metrics); LSG: large-sided game; SSG: small-sided game; CB: continuous bout; Con: continuous format; Int: intermittent format; SBD/MBD/LBD: short/medium/long bout duration; ISSG/CSSG: intermittent/continuous small-sided game; RAST: running-based anaerobic sprint test; ES: effect size; CL: confidence limits; sig: statistically significant; ns: non-significant; ·min^{-1}: per-minute expression.

Table 3. Main findings for psychophysiological outcomes.

Study	Comparison tested	Outcome(s)	Main findings
Alcântara et al. [24]	Short vs long bouts; 3v3 vs 5v5	RPE	Shorter bouts ↑ RPE (sig); 3v3 > 5v5 (sig).
Branquinho et al. [25]	Con vs fractionated	HR	Fractionated formats ↑ HR metrics vs continuous (sig).
Branquinho et al. [12]	0.5, 1, 1.5, 2-min rest	HR, RPE	0.5-min rest ↑ HR/RPE vs 1.5–2-min (sig).
Casamichana et al. [8]	Con vs 2×8 vs 4×4	%HRmax	All ~87% HRmax; small between-format diffs (mostly ns); continuous showed late HR drift.
Chmura et al. [41]	6×30″(2′ rest) vs 6×45″(3′ rest)	TT, FT, C, T/C	Both ↑ TT/FT/C post (sig); 45″(3′) > 30″(2′) for anabolic balance (T/C) (sig).
Christopher et al. [26]	1×8 vs 2×4 vs 4×2	HR, RPE	RPE: 1×8 > 2×4 > 4×2 (sig); HR similar (ns).
Clemente et al. [9]	6×3 vs 3×6	HRmean, RPE	RPE: 3×6 > 6×3 (sig); HRmean ns.
Clemente et al. [11]	6×3 vs 3×6	HRmean, RPE	RPE ↑ in 3×6 (sig); HRmean ns.
Daryanoosh et al. [27]	ISSG vs CSSG (8 wk)	HRmean, HRmax, RPE	ISSG ↓ HRmean & RPE, ↑ HRmax vs CSSG (all sig).
Dios-Álvarez et al. [29]	1 vs 2 vs 4-min rest	RPE	2-min rest > 1-min for RPE (sig); 4-min ≈ 1-min (ns).
Esqueda et al. [28]	3×6 vs 6×3	HRmean, HRpeak	3×6 > 6×3 for HRmean/HRpeak (sig).
Farhani et al. [38]	Con vs 2×6 vs 3×4; 3v3 vs 4v4	%HRpeak, lactate, RPE, PACES	Con > Int for %HRpeak, lactate, enjoyment (sig); 3v3 > 4v4 for HR/lactate/RPE (sig).
Farhani et al. [39]	Sex × regimen	%HRpeak, lactate, RPE, PACES	Females: intermittent most enjoyable; CB ↑ HR/lactate/RPE (sig). Males: CB highest enjoyment & HR/lactate/RPE (sig).
Farhani et al. [34]	CB vs 2×6 vs 3×4	POMS (TMD & subscales)	CB & 2×6 ↓ TMD, depression/anger/tension/confusion (sig); 3×4 ns for TMD.
Hill-Haas et al. [35]	Con vs Int	%HRmax, RPE, lactate	Con > Int for %HRmax & RPE (sig); lactate ns.
Ispirlidis et al. [47]	Con vs Int-I vs Int-II	%HRmax, time in zones, RPE, sRPE	Con highest %HRmax (sig); Int-I highest RPE/sRPE (sig); Int-II maintained more time >80%HRmax with lower RPE (sig).
Köklü [7]	2v2 vs 3v3 vs 4v4; Con vs Int	HR/%HRmax, lactate	3v3 > others for HR/%HRmax (sig); 2v2 > others for lactate (sig); con vs int differences minimal (mostly ns; 2v2 lactate higher in Con, sig).
Köklü et al. [30]	1 vs 2 vs 3 vs 4-min rest	%HRmax/%HRR, lactate, RPE	1-min rest > 3–4 min for all (sig); 4-min lowest (sig).
Köklü et al. [43]	CON vs SBD vs MBD vs LBD	%HRmax, lactate, RPE	SBD & CON > LBD for lactate/RPE (sig); %HRmax highest in CON/LBD (sig).
Kryściak et al. [32]	30″ vs 45″ (1:4)	HR, lactate, pH, HCO_3^-, BE	Both ↑ HR/lactate (sig); 30″ caused greater acidosis (↓HCO_3^-/BE, ↓pH) vs 45″ (sig).
McLean et al. [36]	30 s vs 120 s rest	HRmean/peak, HHb, RPE	During bouts: all ns; recovery HR lower with 120-s (sig).
McLean et al. [37]	30 s vs 120 s rest	HR, RPE	During bouts: ns; recovery HR lower with 120-s (sig).
Mulazimoglu & Kartoglan [40]	Con vs Int	HR zones	Int ↑ time in zone 5 (>94%HRmax) (sig); Con ↑ time in zone 3 (sig).
Nagy et al. [31]	1:2 vs 1:1 vs 1:0.5	HRavg, time in zones	Shorter rests ↑ HRavg and time at 90–100%HRmax (sig).
Pancar et al. [44]	ISSG vs CSSG (5 wk)	sRPE	CSSG > ISSG for sRPE (sig).
Zanetti et al. [42]	Extensive vs Intensive	sRPE, ITL	Intensive > Extensive for sRPE & ITL (sig).

HR: heart rate; HRmean/HRavg: mean/average heart rate; HRpeak: peak heart rate; HRmax: maximal heart rate; %HRmax: percentage of maximal heart rate; %HRR: percentage of heart-rate reserve; HHb: deoxyhemoglobin (near-infrared spectroscopy); HCO_3^-: bicarbonate; BE: base excess; pH: blood acidity; RPE: rating of perceived exertion; sRPE: session RPE; ITL: internal training load (RPE × session duration); TT/FT/C: total testosterone/free testosterone/cortisol; T/C: testosterone-to-cortisol ratio; POMS: Profile of Mood States; TMD (POMS): total mood disturbance; PACES: Physical Activity Enjoyment Scale; Con/CB: continuous format/continuous bout; Int: intermittent format; Int-I/Int-II: intermittent models I and II (study-specific intermittent structures); SBD/MBD/LBD: short/medium/long bout duration; ISSG/CSSG: intermittent/continuous small-sided game; REC-30/REC-120: recovery conditions with 30-s or 120-s rest; 1:2, 1:1, 1:0.5: work-to-rest ratios; 30″/45″: 30-s/45-s work intervals; sig: statistically significant; ns: non-significant.

Table 4. Main findings for technical outcomes.

Study	Comparison tested	Outcome(s)	Main findings
Alcântara et al. [24]	Short vs long bouts; 3v3 vs 5v5	Passes/contacts/involvements	Shorter bouts ↑ individual actions (sig); 3v3 > 5v5 (sig).
Christopher et al. [26]	1×8 vs 2×4 vs 4×2	Goals, shots, passes, possessions	Intermittent > Continuous for goals and shots (sig); passes/possessions ns.
Farhani et al. [38]	Con vs 2×6 vs 3×4	% passes, tackles, duels, ball loss	Con > Int for % passes and ↓ ball loss (sig); 3v3 showed higher duels; 4v4 higher tackles (sig).
Farhani et al. [39]	Sex × regimen	Same as above	Females: Intermittent > Continuous for overall technical execution (sig). Males: Continuous > Intermittent (sig).
Farhani et al. [34]	CB vs 2×6 vs 3×4; 3v3 vs 4v4	% passes/tackles/duels, ball loss	CB ↑ % passes & ↓ ball loss (sig); 3v3-CB ↑ duels (sig); 4v4-CB ↑ tackles (sig).
Hidalgo-de Mora et al. [46]	LSG4/LSG8/SSG4	Kick velocity	KV impaired post-SSG (small pitch) vs baseline and vs LSG (sig).
Köklü et al. [30]	1 vs 2 vs 3 vs 4-min rest	Touches, passes (total/successful/received), tackles	1-min rest ↓ passing metrics (sig); 4-min rest ↑ total/successful passes (sig); 3-min ↑ tackles/touches (sig).
McLean et al. [37]	30 s vs 120 s rest	16 skill metrics	120-s rest ↑ successful tackles (sig); other skills ns.

KV: kick velocity; % passes: percentage of successful passes; ball loss: turnovers in possession; duels: one-vs-one contested actions; tackles: defensive ball-winning actions; Con/CB: continuous format/continuous bout; Int: intermittent format; SSG/LSG: small-/large-sided game; sig: statistically significant; ns: non-significant.