JOURNAL OF ATHLETIC PERFORMANCE AND SPORTS MEDICINE
https://journalapsm.com
e-ISSN 3062-4517 2025, 2 (2), 62-70 *Original Article*

Half-Time Re-Warm-Up Strategies and Second-Half Performance Outcomes in Soccer: A Systematic Review

Emre Silan[1ABCDE], Recep Fatih Kayhan[2BCD], Türker Bıyıklı[3DE]
[1]*Marmara University, Institute of Health Sciences, Department of Movement and Training, Turkey*
[2] *Marmara University, Faculty of Sports Sciences, Department of Coach Education, Turkey.*
[3] *Marmara University, Faculty of Sports Sciences, Department of Coach Education, Turkey.*

Authors' Contribution: *A: Study design, B: Data collection, C: Data analysis, D: Manuscript preparation, E: Discussion and conclusion*
Corresponding author: emresilan@hotmail.com
Published: 30.12.2025
DOI: 10.5281/zenodo.18158127

ABSTRACT

Background: Passive rest during the half-time interval in soccer is associated with reductions in muscle temperature and transient impairments in high-intensity performance at the start of the second half. Half-time re-warm-up (RWU) strategies have been proposed to counteract these effects; however, evidence regarding their effectiveness remains scattered.
Objective: This systematic review aimed to synthesize the available evidence on the effects of half-time re-warm-up strategies on second-half performance outcomes in soccer.
Methods: A systematic literature search was conducted in PubMed, Scopus, and Web of Science following PRISMA 2020 guidelines. Experimental and quasi-experimental studies examining physiological, perceptual, or performance-related outcomes following half-time RWU interventions were included. Study selection and data extraction were performed independently by two reviewers.
Results: Eight studies met the inclusion criteria. Passive half-time rest consistently resulted in reductions in muscle temperature and decrements in sprint, jump, and explosive performance. In contrast, active and combined RWU strategies—including aerobic, agility-based, resistance, and short-duration protocols—attenuated these declines and, in some cases, enhanced acute performance. Benefits were most evident during the early phase of the second half across different competitive levels.
Conclusions: Half-time re-warm-up strategies are effective in preserving physiological readiness and optimizing second-half performance in soccer. Time-efficient RWU protocols represent a practical alternative to passive rest in competitive settings.
Keywords: re-warm-up, half-time, soccer, performance, muscle temperature, systematic review

INTRODUCTION

Soccer is a high-intensity intermittent sport characterized by two 45-minute periods separated by a mandatory 15-minute half-time interval. Traditionally, professional players engage in comprehensive pre-match warm-up (WU) routines designed to optimize performance by increasing intramuscular temperature, enhancing nerve conductance rate, and facilitating metabolic reactions (Abade et al., 2017). However, the typical passive nature of the half-time period, often used for tactical feedback and rest, can lead to a significant decline in physiological readiness. During this 15-minute interval, core body and muscle temperatures have been shown to decrease by approximately 1.1°C and 2.0°C, respectively. Critically, every 1°C reduction in muscle temperature can result in a 3% degradation in lower-body power output (Christaras et al., 2023).

This "cooling" effect is associated with a notable reduction in sprinting performance and high intensity running distance during the initial 15 minutes of the second half (Kaya et al., 2021). Studies indicate that as many as 20% of elite players experience these performance decrements, which are also linked to an increased risk of injury. To counteract these negative outcomes, the implementation of re-warm-up (RWU) strategies has gained prominence in sports science as a means to maintain physiological and mental readiness (Abade et al., 2017). These active strategies involve brief, high-intensity exercise bouts aimed at preserving muscle temperature and enhancing neuromuscular activation during the break (Neves et al., 2025).

Specific active RWU protocols, such as plyometric exercises and repeated changes of direction (RCOD), have proven to be quick and efficient activities for attenuating losses in vertical jump and sprint capacity. These interventions often rely on the mechanism of post-activation potentiation (PAP), which acutely enhances the muscle group's ability to produce force following intense activity (Nourshahi

©JAPSM

et al., 2024). Furthermore, recent neuroimaging research suggests that RWU practices can improve the functional connectivity between brain networks, such as the executive and attention networks, which are critical for accurate decision-making in the rapidly changing scenarios of a match. (Nourshahi et al., 2024).

Despite the clear physiological and cognitive advantages, many coaches and practitioners face significant barriers to the regular implementation of active RWU, primarily due to limited time, lack of space, and the specific physical demands of the players (Kaya et al., 2021). Furthermore, there is currently no consensus on a single "gold standard" protocol that can attenuate all performance losses provoked by passive rest. Therefore, this systematic review aims to critically analyze the efficacy of various half-time re-warm-up strategies, identifying optimal exercise modes and durations to help soccer coaching staff improve second-half performance outcomes.

METHODS

Research Design

This study was designed as a systematic review conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines (PRISMA; Page et al., 2021). The review aimed to systematically identify, appraise, and synthesize existing scientific evidence regarding the effects of half-time re-warm-up strategies on second-half performance outcomes in soccer.

The methodological framework of the review was structured according to the PICO model (Population, Intervention, Comparison, Outcome) to ensure a transparent and reproducible search strategy (Higgins & Green, 2011; Methley et al., 2014). This approach allowed for the inclusion of studies examining different re-warm-up modalities applied during half-time and their acute effects on physiological, perceptual, and performance-related outcomes.

Only original research articles employing experimental or quasi-experimental designs were considered eligible, in line with established recommendations for systematic reviews in sport and exercise science (Liberati et al. & 2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. Bmj, 339.; Page et al., 2021). Both laboratory-based and field-based studies conducted under ecologically valid conditions were included, provided that the intervention was implemented during a simulated or real half-time period.

The review focused exclusively on studies involving soccer players or physically active individuals, as soccer-specific match demands and half-time characteristics differ substantially from those of other team sports (Mohr et al., 2003; Bangsbo et al., 2006). The review protocol was developed a priori to minimize selection bias and ensure methodological consistency throughout the screening and data extraction processes (Egger et al., 2022).

Search Strategy

A systematic literature search was conducted to identify studies examining the effects of half-time re-warm-up strategies on second-half performance outcomes in soccer, following PRISMA 2020 recommendations (Page et al., 2021). The search was performed in the following electronic databases: Web of Science, Scopus, and PubMed, which are widely recognized as core databases for sport and exercise science research (Gusenbauer & Haddaway, 2020).

The search strategy was developed based on the PICO framework and included a combination of keywords and Boolean operators related to re-warm-up interventions and soccer performance. The following search string was applied across all databases, with minor adaptations when necessary:

(“re-warm-up” OR “half-time warm-up” OR “half-time strategy” OR “second-half warm-up” OR “RW-U strategy”) AND (soccer OR football)

The search was limited to peer-reviewed articles published in English, without restrictions on publication year, to ensure comprehensive coverage of the available literature (Liberati et al., 2009). In addition, reference lists of all included studies were manually screened to identify potentially relevant

articles not captured by the electronic search, as recommended for systematic reviews (Greenhalgh & Peacock, 2005).

All identified records were imported into a reference management software, and duplicate studies were removed prior to screening. The overall selection procedure strictly followed PRISMA 2020 guidelines and was conducted independently by the reviewers (Page et al., 2021).

Eligibility Criteria

Study eligibility was determined according to predefined inclusion and exclusion criteria based on the PICO framework, which is commonly used to structure research questions and eligibility decisions in systematic reviews (Methley et al., 2014).

Table 1. Search strategy and inclusion/exclusion criteria based on PICO (Population, Intervention, Comparison and Outcome).

Category	Description
Databases	Web of Science, Scopus, PubMed
Search Terms	("Re-warm-up" OR "Half-time warm-up" OR "Half-time strategy" OR "Second-half warm-up") AND (soccer OR football)
Population (P)	Soccer players (professional, semi-professional, amateur) and physically active healthy individuals
Intervention (I)	Re-warm-up strategies applied during half-time, including active (e.g., running, dynamic exercises), passive (e.g., heated garments), or combined protocols
Comparison (C)	Passive rest, no re-warm-up, or alternative re-warm-up strategies
Outcome (O)	Physiological outcomes (muscle temperature, heart rate), performance outcomes (sprint, jump, repeated sprint ability), perceptual responses (RPE, readiness), and match-related performance indicators
Inclusion Criteria	Studies involving soccer players or physically active individuals; implementation of re-warm-up strategies during half-time; evaluation of physical, physiological, or perceptual outcomes; experimental or quasi-experimental design; full-text articles published in English
Exclusion Criteria	Studies not related to soccer; interventions not applicable to real match settings; lack of a comparison or control condition; absence of pre–post outcome measures; outcomes unrelated to performance or physiological responses; studies not examining post–half-time effects; reviews, editorials, or conference abstracts

Study Selection

The study selection process was carried out independently by two authors, in accordance with PRISMA 2020 recommendations (Page et al., 2021). Initially, the titles and abstracts of all identified records were screened to assess their relevance to the research question. Studies that clearly did not meet the inclusion criteria were excluded at this stage.

Following the initial screening, the full texts of all potentially eligible articles were retrieved and independently evaluated by the same two authors for final inclusion. After this assessment, the authors compared their selections and reached a consensus regarding study eligibility. In cases of disagreement or uncertainty, a third author was consulted to resolve discrepancies, consistent with established systematic review methodology (Egger et al., 2022).

In addition, the reference lists of all included studies and relevant systematic reviews were manually screened to identify additional studies that may not have been captured through database searches, as recommended to enhance search sensitivity (Greenhalgh & Peacock, 2005).

Data Extraction

Data extraction was performed independently by two researchers using a standardized data extraction form, following established best practices for systematic reviews (Egger et al., 2022). Extracted data included authors, year of publication, study design, sample size, participant characteristics (age, sex, competitive level), and detailed information regarding the re-warm-up intervention.

Additional information on the type, duration, and intensity of the re-warm-up protocol, comparison conditions, assessment methods, and primary outcomes was collected. Performance-related outcomes were categorized as acute effects (assessed immediately after half-time) or short-term effects (assessed during the second half), in line with prior sport performance research frameworks (Russell et al., 2015).

All extracted data were summarized in a structured matrix to facilitate systematic comparison across studies. A third investigator reviewed the extracted data to ensure accuracy and consistency, and any discrepancies were resolved through discussion, as recommended by PRISMA 2020 (Page et al., 2021).

FINDINGS

The literature search identified a total of 738 records through database searching across PubMed (n = 106), Scopus (n = 632), Web of Science. No additional records were identified through other sources. After the removal of duplicate records (n = 68), 670 records remained and were screened based on titles and abstracts.

During the screening process, 614 records were excluded for not meeting the predefined inclusion criteria. The most common reasons for exclusion at this stage were the absence of a half-time re-warm-up intervention, lack of relevance to soccer or football, non-original study designs, and outcomes not related to physical, physiological, or perceptual performance measures.

Following the initial screening, 56 full-text articles were sought and successfully retrieved. All retrieved reports were assessed for eligibility. Of these, 48 full-text articles were excluded after detailed evaluation. The primary reasons for full-text exclusion included the absence of a comparison or control condition (n = 17), lack of pre–post outcome measures (n = 11), re-warm-up interventions not applied during the half-time period (n = 9), outcomes not directly related to performance or physiological responses (n = 6), and methodological or ecological limitations (n = 5).

Ultimately, eight studies met all eligibility criteria and were included in the qualitative synthesis of the systematic review. No studies were included in a quantitative synthesis (meta-analysis) due to heterogeneity in study designs, intervention protocols, and outcome measures.

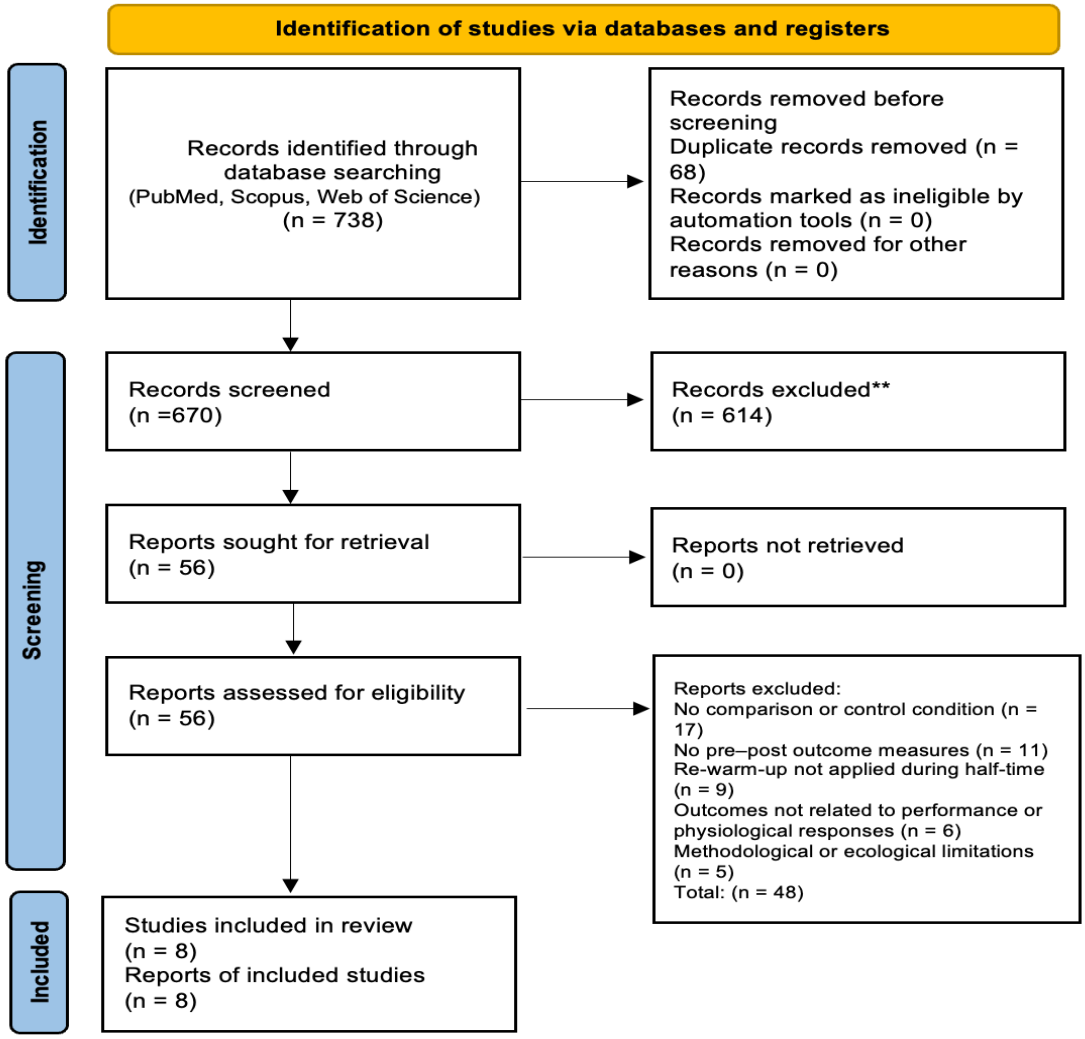

Figure 1. PRISMA 2020 flow diagram illustrating the study selection process

Table 2. Characteristics of Studies Included in the Systematic Review (n = 8)

Study (Year)	Sample	Study Design	Half-Time Re-Warm-Up Protocol	Comparison Condition	Outcome Measures	Key Findings
Mohr et al., 2003	Competitive male soccer players	Match-based experimental study	Low-intensity physical activity performed during half-time to maintain muscle temperature	Passive half-time rest	Muscle temperature; sprint performance	Passive rest led to a reduction in muscle temperature and sprint performance at the start of the second half, whereas re-warm-up attenuated these declines.
Lovell et al., 2007	Soccer players	Controlled experimental study	Active half-time re-warm-up involving aerobic activity	Passive rest	Thermoregulatory responses; endurance performance	Active re-warm-up strategies improved thermoregulation and helped maintain endurance performance in the second half.
Lovell et al., 2013	10 semi-professional male soccer players	Randomized crossover design (SAFT90 simulation)	Intermittent agility exercises or whole-body vibration during half-time	Seated passive rest	Speed; power; dynamic strength	Both re-warm-up protocols reduced declines in speed and power compared with passive rest.

Study (Year)	Sample	Study Design	Half-Time Re-Warm-Up Protocol	Comparison Condition	Outcome Measures	Key Findings
Edholm et al., 2015	22 professional male soccer players	Crossover design across two competitive matches	Low-intensity re-warm-up performed during half-time	Traditional passive rest	Sprint performance; jump performance; time–motion analysis	Re-warm-up improved sprint and jump performance and enhanced movement patterns during the initial phase of the second half.
Zois et al., 2015	Team-sport trained athletes (soccer-specific protocol)	Randomized crossover design	Short-duration, high-intensity re-warm-up (small-sided games or resistance exercises)	Passive recovery	Physical performance; sport-specific skill performance	Short, high-intensity re-warm-up protocols resulted in superior physical and skill-related performance compared with passive recovery.
Fashioni et al., 2020	10 male soccer players	Crossover design using a soccer-specific exercise protocol	Practical half-time re-warm-up strategy applicable in match settings	Passive half-time rest	Sprint performance; jump performance; perceptual responses	The re-warm-up strategy attenuated performance decrements and improved perceived readiness in selected performance measures.
Christaras et al., 2023	23 elite U17 soccer players	Field-based crossover study	Very short (~3 min) half-time re-warm-up program	Passive rest	Body temperature; sprint speed; agility; jump performance; match running metrics	A brief re-warm-up limited reductions in body temperature and mitigated declines in sprint and jump performance at the beginning of the second half.
Sanchez-Sanchez et al., 2024	20 youth male soccer players	Randomized crossover design	Elastic-band resistance exercises performed during half-time	Control condition	Immediate sprint and jump performance	Elastic-band re-warm-up elicited acute improvements in explosive performance compared with the control condition.

Evidence from the included studies consistently indicates that passive rest during half-time leads to reductions in muscle temperature and an associated decline in sprint and explosive performance at the onset of the second half. Early match-based investigations demonstrated that maintaining physical activity during half-time attenuates these decrements, resulting in improved sprint performance compared with passive recovery (Mohr et al., 2003).

Subsequent experimental studies confirmed that active half-time re-warm-up strategies involving aerobic activity enhance thermoregulatory responses and help preserve endurance-related performance in the second half when compared with seated rest (Lovell et al., 2007). These findings were further supported by randomized crossover designs using soccer-specific simulations, which showed that intermittent agility exercises and whole-body vibration during half-time reduced declines in speed, power, and dynamic strength relative to passive rest (Lovell et al., 2013).

Field-based crossover studies conducted under competitive match conditions reported that low-intensity re-warm-up activities performed during half-time improved sprint and jump performance and positively influenced movement patterns during the early stages of the second half (Edholm et al., 2015). In addition, short-duration, high-intensity re-warm-up protocols incorporating small-sided games or resistance exercises elicited superior physical and sport-specific skill performance compared with passive recovery in team-sport athletes following a soccer-specific protocol (Zois et al., 2015).

More recent investigations emphasized the practical applicability of half-time re-warm-up strategies in real match settings. A crossover study in male soccer players showed that a feasible re-warm-up routine attenuated decrements in sprint and jump performance and improved perceptual measures of readiness (Fashioni et al., 2020). Similarly, research in elite youth soccer players demonstrated that a very short (~3 min) re-warm-up intervention limited reductions in body temperature and mitigated declines in sprinting and jumping performance at the beginning of the second half (Christaras et al., 2023).

Finally, emerging evidence suggests that resistance-based re-warm-up modalities may offer additional acute benefits. Elastic-band resistance exercises performed during half-time resulted in immediate improvements in sprint and jump performance compared with a control condition in youth soccer players (Sánchez-Sánchez et al., 2024).

DISCUSSION AND CONCLUSION

The purpose of this systematic review was to critically examine the effects of half-time re-warm-up (RWU) strategies on second-half performance outcomes in soccer. The main findings indicate that passive rest during half-time is consistently associated with reductions in muscle temperature and transient impairments in sprinting, jumping, and explosive actions at the start of the second half. In contrast, active or combined RWU strategies appear effective in preserving physiological readiness and enhancing acute and short-term performance outcomes across different competitive levels.

The performance benefits observed following RWU interventions can be largely explained by temperature-related and neuromuscular mechanisms. Passive half-time rest leads to substantial reductions in muscle and core temperature, which negatively affect cross-bridge cycling kinetics, nerve conduction velocity, and muscle-tendon stiffness. These physiological alterations are known to impair force production and power output, particularly during high-intensity actions such as sprinting and jumping. The consistent attenuation of performance decrements reported in the included studies suggests that RWU protocols effectively counteract these temperature-related impairments by maintaining or partially restoring muscle temperature prior to the second half (Mohr et al., 2003; Lovell et al., 2013; Christaras et al., 2023).

In addition to thermal effects, several RWU protocols included short bouts of high-intensity or resistance-based exercises, which may have elicited post-activation performance enhancement mechanisms. Such strategies can acutely enhance motor unit recruitment and neuromuscular efficiency, thereby improving explosive performance immediately after the break. The superior outcomes reported following intermittent agility drills, whole-body vibration, and elastic-band resistance exercises support the relevance of neuromuscular priming as a complementary mechanism to temperature maintenance (Lovell et al., 2013; Zois et al., 2015; Sánchez-Sánchez et al., 2024).

An important observation across studies is that the positive effects of RWU strategies are most pronounced during the initial phase of the second half. This period is typically characterized by the largest performance decrements following passive rest and is also associated with an increased incidence of high-intensity actions and injury risk. By mitigating early second-half declines, RWU strategies may contribute not only to performance optimization but also to improved readiness during a critical phase of match play (Edholm et al., 2015; Christaras et al., 2023).

Moreover, the effectiveness of RWU protocols was observed across a wide range of player populations, including professional, semi-professional, and youth soccer players. This suggests that RWU strategies can be adapted to different competitive levels, provided that exercise intensity and duration are appropriately adjusted. Notably, even very short RWU interventions (~3–5 minutes) were sufficient to produce meaningful benefits, highlighting the importance of efficiency in applied settings where time and space are limited (Fashioni et al., 2020; Christaras et al., 2023).

From an applied perspective, the findings of this review support the integration of structured RWU strategies into half-time routines in soccer. Coaches should consider implementing brief, active protocols that combine low- to moderate-intensity movement with short bursts of higher-intensity or resistance-based exercises. Such approaches appear effective in preserving sprint and jump performance while remaining feasible within the logistical constraints of competitive matches.

However, the absence of a universally optimal RWU protocol suggests that interventions should be individualized based on player characteristics, match context, and available resources. Factors such as accumulated fatigue, positional demands, environmental conditions, and substitution strategies should be taken into account when designing half-time RWU routines.

Despite the consistency of findings, several limitations should be acknowledged. The included studies displayed considerable heterogeneity in study design, RWU protocols, outcome measures, and assessment timing, which precluded quantitative synthesis. Furthermore, most studies focused on acute performance outcomes, with limited investigation into longer-term effects on match performance, fatigue accumulation, or injury incidence.

Future research should aim to standardize RWU protocol reporting, including precise descriptions of intensity, duration, and exercise content. Additionally, more field-based studies conducted during official competitions are needed to enhance ecological validity. Investigations combining physiological,

biomechanical, and perceptual measures may also provide a more comprehensive understanding of how RWU strategies influence performance and decision-making during the second half.

In summary, the evidence synthesized in this review demonstrates that half-time re-warm-up strategies are effective in mitigating the negative physiological and performance consequences of passive rest in soccer. Active and combined RWU protocols consistently preserve muscle temperature and enhance acute and short-term performance outcomes, particularly during the early stages of the second half. These findings underscore the importance of structured half-time preparation and provide a strong rationale for the routine implementation of RWU strategies in modern soccer practice.

REFERENCES

Abade, E., Sampaio, J., Gonçalves, B., Baptista, J., Alves, A., & Viana, J. (2017). Effects of different re-warm up activities in football players' performance. PloS one, 12(6), e0180152.

Bangsbo, J., Mohr, M., & Krustrup, P. (2006). Physical and metabolic demands of training and match-play in the elite football player. Journal of sports sciences, 24(07), 665-674.

Christaras, M., Michailidis, Y., Mandroukas, A., Vardakis, L., Christoulas, K., & Metaxas, T. (2023). Effects of a short half-time re-warm-up program on matches running performance and fitness test performance of male elite youth soccer players. Applied Sciences, 13(4), 2602.

Christaras, M., Michailidis, Y., Mandroukas, A., Vardakis, L., Christoulas, K., & Metaxas, T. (2023). Effects of a short half-time re-warm-up program on matches running performance and fitness test performance of male elite youth soccer players. Applied Sciences, 13(4), 2602. https://doi.org/10.3390/app13042602

Edholm, P., Krustrup, P., & Randers, M. B. (2015). Half-time re-warm up increases performance capacity in male elite soccer players. Scandinavian journal of medicine & science in sports, 25(1), e40-e49.

Egger, M., Higgins, J. P., & Smith, G. D. (2022). Systematic Reviews in Health Research. Wiley.

Fashioni, E., Langley, B., & Page, R. M. (2020). The effectiveness of a practical half-time re-warm-up strategy on performance and the physical response to soccer-specific activity. Journal of sports sciences, 38(2), 140-149.

Greenhalgh, T., & Peacock, R. (2005). Effectiveness and efficiency of search methods in systematic reviews of complex evidence: audit of primary sources. Bmj, 331(7524), 1064-1065.

Gusenbauer, M., & Haddaway, N. R. (2020). Which academic search systems are suitable for systematic reviews or meta-analyses? Evaluating retrieval qualities of Google Scholar, PubMed, and 26 other resources. Research synthesis methods, 11(2), 181-217.

Higgins, J. P. T., & Green, S. (2011). Internet. Cochrane handbook for systematic reviews of interventions version, 5(0).

Kaya, S., Cug, M., & Behm, D. G. (2021). Foam rolling during a simulated half-time attenuates subsequent soccer-specific performance decrements. Journal of bodywork and movement therapies, 26, 193-200.

Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P., ... & Moher, D. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. Bmj, 339.

Lovell, R. J., Kirke, I., Siegler, J., McNaughton, L. R., & Greig, M. P. (2007). Soccer half-time strategy influences thermoregulation and endurance performance. Journal of sports medicine and physical fitness, 47(3), 263.

Lovell, R., Midgley, A., Barrett, S., Carter, D., & Small, K. (2013). Effects of different half-time strategies on second half soccer-specific speed, power and dynamic strength. Scandinavian journal of medicine & science in sports, 23(1), 105-113.

Methley, A. M., Campbell, S., Chew-Graham, C., McNally, R., & Cheraghi-Sohi, S. (2014). PICO, PICOS and SPIDER: a comparison study of specificity and sensitivity in three search tools for qualitative systematic reviews. BMC health services research, 14(1), 579.

Mohr, M., Krustrup, P., & Bangsbo, J. (2003). Match performance of high-standard soccer players with special reference to development of fatigue. Journal of sports sciences, 21(7), 519-528.

Neves, P. P., Marques, D., Neiva, H. P., Nunes, C., Faíl, L., Ferraz, R., ... & Alves, A. R. (2025). Warm-up and Re-warm-up Insights into Resistance Training: Usual Practices among Strength and Conditioning Coaches and Athletes. The Open Sports Sciences Journal, 18(1).

Nourshahi, M., Ezadan, H., Haji, S., Farahmand, F., & Haghparast, A. (2024). Effect of re-warm-up practices on brain networks and physical performance in soccer players. Science & Sports, 39(5-6), 453-462.

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... & Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. bmj, 372.

Russell, M., West, D. J., Briggs, M. A., Bracken, R. M., Cook, C. J., Giroud, T., ... & Kilduff, L. P. (2015). A passive heat maintenance strategy implemented during a simulated half-time improves lower body power output and repeated sprint ability in professional rugby union players. PloS one, 10(3), e0119374.

Sanchez-Sanchez, J., Clemente, F. M., Ramirez-Campillo, R., & Rodríguez-Fernández, A. (2024). Elastic Bands During Half-Squats as A Re-Warm-Up Strategy for Youth Soccer Players' Performance. Journal of Sports Science & Medicine, 23(4), 843.

Zois, J., Bishop, D., & Aughey, R. (2015). High-intensity warm-ups: effects during subsequent intermittent exercise. International Journal of Sports Physiology and Performance, 10(4), 498-503.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International Licence.