

INPLASY PROTOCOL

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None declared.

Effects of High-Intensity Interval Training on Physical Fitness among Team-Sport Athletes: A Systematic Review and Meta-analysis

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Review question / Objective: The systematic review and meta-analysis aimed to assess the effects of HIIT on the health and skill-related physical fitness of team-sport athletes to enhance the overall performance of team sports participants. **P:** athletes in team sports; **I:** high-intensity interval training; **C:** general training or other training; **O:** maximal oxygen uptake, repetitive sprint capacity, vertical jump capacity, agility, and muscular strength and muscular endurance; **S:** Both retrospective and prospective.

Condition being studied: The research area of this study is the training intervention of physical fitness of athletes in team sports. It is known that physical fitness is the basic sports guarantee for team sports, especially for sports with intense confrontations on the same field, such as, hockey, basketball, soccer, field hockey, etc. High-intensity interval training is a very effective training tool to improve the sprinting ability, maximum oxygen uptake, and vertical jumping ability of team athletes. Through a systematic review, the effects of high-intensity interval training on the physical quality of athletes in team sports are summarized to further explore the scientific and reasonable training contents and methods.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 11 January 2023 and was last updated on 11 January 2023 (registration number INPLASY202310028).

INTRODUCTION

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METHODS

Participant or population: Inclusion criteria: Team sports athletes. Exclusion criteria: those who have suffered from severe cardiovascular disease, musculoskeletal system diseases, or other sports contraindications.

Intervention: High-intensity interval training includes short, high-intensity repetitions of sprint training, interval training, hypoxic or normoxic training, but does not include moderate or ground-intensity interval training. High-intensity interval training.

Comparator: The control athletes participated in regular training or performed other forms of aerobic training, such as moderate intensity interval training, small-sided game training, and training with different interval times.

Study designs to be included: This review includes human randomized controlled clinical trials (RCTs). According to our study design, included studies should focus on the effects of high-intensity interval training on team-sport athletes interventions compared with no specific exercise intervention or other exercise interventions.

Eligibility criteria: 1. It is a full-text, peer-reviewed study published in English describing the use of team-sport athletes (male or female) to explore the effects of high-intensity interval training interventions on physical fitness, randomized controlled trial (RCT) with two or more groups, single-group trials with pre-test and post-test design, and two and more group with comparison experiments design. 2. They were prescribed HIIT [e.g., $\geq 90\%$ of maximal oxygen uptake], 90–95% peak heart rate, or maximal interval sprinting. 3. They are studies on planned and organized HIIT interventions to improve or maintain health and skill-related physical fitness, as well as studies using HIIT or combinations of HIIT and other exercise training interventions (e.g., plyometric training, strength training, small-side games training). 4. The studies investigate the effects of HIIT on physical fitness among team-sport athletes and assess at least one physical fitness component outcome. 5. There were no restrictions on the sample size, age, sex, competitive level, study location, and intervention duration for the included studies.

Information sources: Databases: PubMed, Web of Science, EBSCOhost, Scopus, CINAHL Plus, Google Scholar.

Main outcome(s): Physical fitness: maximum oxygen uptake, repetitive sprinting ability, vertical jumping ability, agility, muscular endurance, and so on.

Quality assessment / Risk of bias analysis: The study was evaluated based on the PEDro scale. The PEDro scale score of the included twenty-four studies is 3.92 (range 3–4), indicating that the included studies' quality met the basic requirements for systematic review and meta-analysis when judged by the PEDro criteria, although none of the papers scored more than 5. All articles met the eligibility criteria, had similar baselines, comparisons between the groups, and a point measure and variability. Random allocation was not described in the text of 2 studies, and none mentioned allocation concealment, blinded subjects, blinded therapists, blinded

therapists, blinded assessors, or follow-option-to-treat analyses.

Strategy of data synthesis: Statistical analysis was performed by using the Review Manager 5 software. Continuous outcomes measured on the same scale were expressed as a mean value and standard deviation and analyzed using weighted mean differences (WMD). I-square(I²) test was performed to assess the impact of study heterogeneity on the meta-analysis results. According to the Cochrane review guidelines, the random effect models were chosen if severe heterogeneity was presented at I²>50%. Since the studies included in the study were randomized controlled trials, the other I²<50% and the random effects model were used.

Subgroup analysis: Subgroup analyses were performed for different types of high-intensity interval training interventions, mainly including different aspects of sprint interval training, repetitive running training, short interval training and long interval training, as well as other aspects not mentioned.

Sensitivity analysis: Sensitivity analysis was conducted by deleting each study individually to evaluate the quality and consistency of the results.

Language restriction: English.

Country(ies) involved: China.

Keywords: High-intensity interval training; physical fitness; team-sport athletes; training intensity; training interval.

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