

# INPLASY PROTOCOL

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**Corresponding author:**  
Filipe Manuel Clemente

filipe.clemente5@gmail.com

**Author Affiliation:**  
Escola Superior Desporto e  
Lazer, Instituto Politécnico de  
Viana do Castelo, Rua Escola  
Industrial e Comercial de  
Nun'Álvares, 4900-347 Viana do  
Castelo, Portugal

**Support:** None.

**Review Stage at time of this  
submission:** Formal screening  
of search results against  
eligibility criteria.

**Conflicts of interest:** None.

## Effects of re-warm-up protocols on physical performance of soccer players: A systematic review with meta-analysis

Fernández, FTG<sup>1</sup>; Sarmiento, H<sup>2</sup>; Infantes-Paniagua, A<sup>3</sup>;  
Ramirez-Campillo, R<sup>4</sup>; González-Víllora, S<sup>5</sup>; Clemente, FM<sup>6</sup>.

**Review question / Objective:** This systematic review aimed to:  
(1) identify and summarize the studies that have examined the  
effects acute effects of re-warm-up protocols in physical  
performance of soccer players (vertical heigh jump, horizontal  
jump, sprinting time, change-of-direction); and (2) establish a  
meta-comparison between performing re-warm-up and not  
performing in the outcomes of the vertical heigh jump,  
horizontal jump, sprinting time, change-of-direction.

**Condition being studied:** Physical performance of soccer  
players exposed to re-warm-up.

**Information sources:** Electronic databases (PubMed, Scopus,  
SPORTDiscus, and Web of Science) were searched for  
relevant publications prior to 12 January 2021.

**INPLASY registration number:** This protocol was registered with  
the International Platform of Registered Systematic Review and  
Meta-Analysis Protocols (INPLASY) on 16 January 2021 and was  
last updated on 16 January 2021 (registration number  
INPLASY202110055).

### INTRODUCTION

**Review question / Objective:** This  
systematic review aimed to: (1) identify and  
summarize the studies that have examined  
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direction); and (2) establish a meta-  
comparison between performing re-warm-  
up and not performing in the outcomes of

the vertical heigh jump, horizontal jump, sprinting time, change-of-direction.

**Rationale:** Re-warm-up is used to prepare the players for return to match after a period of cool-down or rest. The use of re-warm-up aims to increase the performance in physical qualities that may allows to improve the overall performance in the match.

**Condition being studied:** Physical performance of soccer players exposed to re-warm-up.

## METHODS

**Search strategy:** Keywords and synonyms were entered in various combinations in the title, abstract or keywords: (soccer OR football) AND (“re-warm-up” OR “post-warm-up” OR “warm-up” OR “pre-activity” OR “post-activation potentiation” OR “stretching”) AND (“jump\*” OR “sprint\*” OR “change-of-direction” OR “agility”).

**Participant or population:** Soccer players from any age or sex, with normal vision, no partial/chronic injury or illness and no history of neuropsychological impairment.

**Intervention:** Re-warm-up protocols (after warm-up before the match, or in between halves of the match).

**Comparator:** Control conditions (passive control).

**Study designs to be included:** Counterbalanced cross-over design. RCT and non-RCT.

**Eligibility criteria:** Inclusion criteria: (1) Soccer players from any age or sex with no injury or illness, with normal vision, no partial/chronic injury or illness and no history of neuropsychological impairment.; (2) Re-warm-up protocols (always performed after an initial warm-up) conducted in one of the two possible conditions: (i) after warm-up and before the match; and (ii) between halves of the match; (3) Passive control conditions; (4) Vertical heigh jump, horizontal jump,

sprinting time and change-of-direction time; (5) Counterbalanced cross-over design (randomized and non-randomized can be included, since all revealing no significant differences in control conditions); (6) Only original and full-text studies written in English. Exclusion criteria: (1) Other population than soccer players or soccer population with special conditions (e.g., injury, treatment, illness, diseases); (2) Warm-up protocols; (3) Other intervention conditions than passive, namely active control (e.g., massage, foam roller); (4) Other physiological or physical conditions not related to the included outcomes; (5) Other study designs that do not allow comparisons within-subjects for the two conditions (control and re-warm-up); (6) Written in other language than English. Other article types than original (e.g., reviews, letters to editors, trial registrations, proposals for protocols, editorials, book chapters and conference abstracts).

**Information sources:** Electronic databases (PubMed, Scopus, SPORTDiscus, and Web of Science) were searched for relevant publications prior to 12 January 2021.

**Main outcome(s):** Vertical heigh jump, horizontal jump, sprinting time and change-of-direction time.

**Data management:** A data extraction was prepared in Microsoft Excel sheet (Microsoft Corporation, Readmon, WA, USA) in accordance with the Cochrane Consumers and Communication Review Group’s data extraction template . The Excel sheet was used to assess inclusion requirements and subsequently tested for all selected studies.

**Quality assessment / Risk of bias analysis:** The quality assessment standard for a cross-over study was used. This tool assesses nine items: (i) appropriate cross-over design; (ii) randomized treatment order; (iii) carry-over effect; (iv) unbiased data; (v) allocation concealment; (vi) blinding; (vii) incomplete outcome data; (viii) selective outcome reporting; and (ix) other bias. A possible scoring of low,

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unclear, and high can be provided by each item.

**Strategy of data synthesis:** Although two studies can be used in meta-analyses, considering reduced sample sizes are common in the sports science literature, including in re-warm-up studies, analysis and interpretation of results in this systematic review and meta-analysis were only conducted in the case of at least three study groups provided baseline and mental fatigue-related data for the same measure.

**Subgroup analysis:** Fitness status; Age; Sex.

**Sensibility analysis:** To adjust for publication bias, a sensitivity analysis was conducted using the trim and fill method, with L0 as the default estimator for the number of missing studies.

**Language:** English.

**Country(ies) involved:** Portugal, Spain, Chile.

**Keywords:** football; performance; sports training; warm-up; neuromuscular.

**Contributions of each author:**

**Author 1 - Francisco Tomás González Fernández -** Lead the project, performed the search and methodological search and made the synthesis of results. Wrote and revised the manuscript.

**Author 2 - Hugo Sarmiento -** Performed the methodological search. Wrote and revised the manuscript.

**Author 3 - Rodrigo Ramirez-Campillo -** Performed the statistical analysis and report. Wrote and revised the manuscript.

**Author 4 - Álvaro Infantes-Paniagua -** Performed the search and methodological search and made the synthesis of results. Wrote and revised the manuscript.

**Author 5 - Sixto González-Víllora -** Wrote and revised the manuscript.

**Author 6 - Filipe Manuel Clemente -** Wrote and revised the manuscript.

**Conflicts of interest:** The authors declare that they have no conflicts of interest relevant to the content of this review.