INPLASY

The effect of cold water immersion after eccentric exercise on delayed onset muscle soreness: evidence based on meta-analysis

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INTRODUCTION

Study aim This study aim to explore the effect of cold water immersion on delayed-onset muscle soreness after eccentric exercise.

Background Eccentric exercise is a great way to improve an athlete's performance, but it can also induce delayed-onset muscle soreness. Cold water immersion is considered an effective strategy to relieve muscle soreness. However, current evidence is contradictory. Based on this, we pooled relevant data through a meta-analytic approach to explore the effectiveness of cold water immersion on delayed-onset muscle soreness.

METHODS

Strategy of data synthesis ("cold water immersion*" or "ice water immersion*" or "water bath*" or "ice bath*" or CWI or cooling) and (eccentric*) and (soreness or pain or damag*).

Eligibility criteria Participate) healthy and uninjured professional athletes or the general population; Intervention) the exercise protocol to induce DOMS was centrifugal exercise; Comparsion) the recovery mode of the control group was passive recovery; Outcome) DOMS within 7 days after centrifugation; Study design) a randomized controlled trial of core articles from China Knowledge.

Data extraction Extracts from this study include 1) study characteristics: authors, year of publication; 2) sample information: nationality, gender, sample size; 3) characteristics of the exercise intervention: eccentric exercise protocol, cold water temperature, immersion time, immersion method, immersion site, and intervals between eccentric exercise followed by immersion in cold water; and 4) outcome metrics: changes in DOMS at different time points of the test as well as in DOMS.

Strategy of data synthesis / Statistical analysis Statistical analysis was conducted utilizing Review Manager 5.4 and Stata software version 16.0. Data

from images were extracted using Get Data Graph Digitizer version 2.26. The outcome measures assessed in the studies included in this meta-analysis were continuous variables. Statistical significance was predetermined at $p \leq 0.05$. Due to the different testing methods and units of each measure, the effect sizes were represented by Standardized Mean Difference (SMD) along with a 95% Confidence Interval (CI). Standardized mean differences are categorized as follows: 0.8 (large) [36]. Heterogeneity among the studies was evaluated using the Homogeneity test. An I^2 value of $\leq 50\%$, suggests that heterogeneity is not significant, and a fixed-effects model is appropriate. Conversely, an I^2 value of $> 50\%$, it indicates significant heterogeneity among the studies, warranting the use of a random-effects model. To ensure the stability of the meta-analysis results, a sensitivity analysis was performed on the outcome measures of the included studies using Stata software version 16.0.

Country(ies) involved China.

Keywords sport performance; recovery strategy; sport injury.

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