



@physicaltherapyresearch

# RAPID RESEARCH

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February 2023

## Inside This Week: Recovery Methods Post-Exercise

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- ✓ Effectiveness of Stretching Post-Exercise

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  - ✓ Do Anti-Oxidants Prevent or Reduce Muscle Soreness?

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  - ✓ Whole-body Cryotherapy for Preventing & Treating Muscle Soreness



# EFFECTIVENESS OF STRETCHING POST-EXERCISE

FEBRUARY 2023

[Click for Full Text  
\(Afonso et al. 2021\)](#)

JBI 11/11 [100%]



This systematic review aimed to review supervised RCTs on the effects of post-exercise stretching on recovery makers vs with passive recovery or alternative recovery method in the short-term ( $\leq 1$  h after exercise) and delayed recovery (24, 48, and 72 h).



# KEY FINDINGS

**21 RCT's included; 229 participants; Risk of bias high in ~70% of studies**

## **Post-exercise Stretching Included:**

Static stretching

Passive stretching

Proprioceptive neuromuscular facilitation (PNF)

Rest, low intensity cycling or running, massage, and cold-water immersion were used as comparators.

## **Between-group Comparisons for Post-Exercise Stretching:**

No effect on strength recovery vs. passive recovery.

No effect on 24, 48, or 72-h post-exercise DOMS vs. passive recovery

# MAIN TAKEAWAYS

Overall, the data does not support nor contradicts the utilization of post-exercise stretching.

The implementation of post-exercise stretching among athletes is, at least, questionable.

However, data is scarce, heterogenous, and overall confidence in cumulative evidence is very low.

Recommendations on whether post-exercise stretching should be applied for the purposes of recovery is unclear at best.



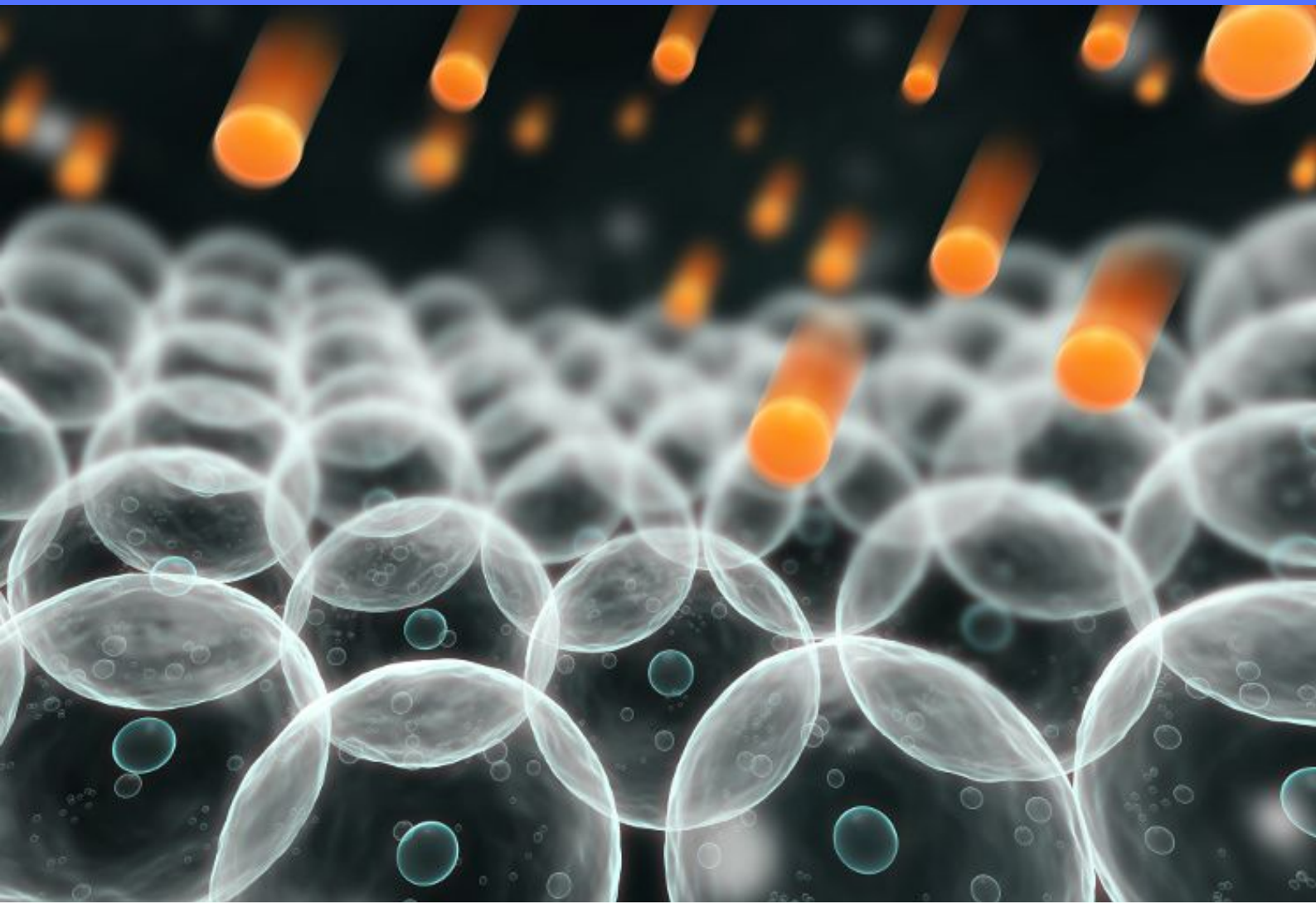
# DO ANTI- OXIDANTS PREVENT OR REDUCE MUSCLE SORENESS?

[Click for Full Text  
\(Ranchordas et al.  
2017\)](#)

JBI 11/11 [100%]



This Cochrane review assessed the effects (benefits and harms) of antioxidant supplements and antioxidant-enriched foods for preventing and reducing the severity and duration of delayed onset muscle soreness (DOMS) following exercise.



**50 RCTs were included, 1089 participants**

## **Muscle Soreness:**

Small difference in favor of antioxidant supplementation after DOMS-inducing exercise at all main follow-ups (6, 24, 48, 72 hrs); Little difference at 96 hrs

## **Muscle Soreness Between Groups:**

All 5 follow-up times well below the minimal important difference.

None of the 50 included trials measured subjective recovery.

## **Adverse Effects:**

6/6 participants in one trial had diarrhea & 4/6 had mild indigestion.

1/26 participants in a second trial had mild gastrointestinal distress.

# MAIN TAKEAWAYS

**Moderate to low-quality evidence suggests high dose antioxidant supplementation does not result in a clinically relevant reduction of muscle soreness after exercise at up to 6, 24, 48, 72 and 96 hours after exercise.**

**There is no evidence available on subjective recovery with antioxidants.**

**There is only limited evidence on the adverse effects of taking antioxidant supplements.**

# WHOLE-BODY CRYOTHERAPY FOR PREVENTING & TREATING MUSCLE SORENESS

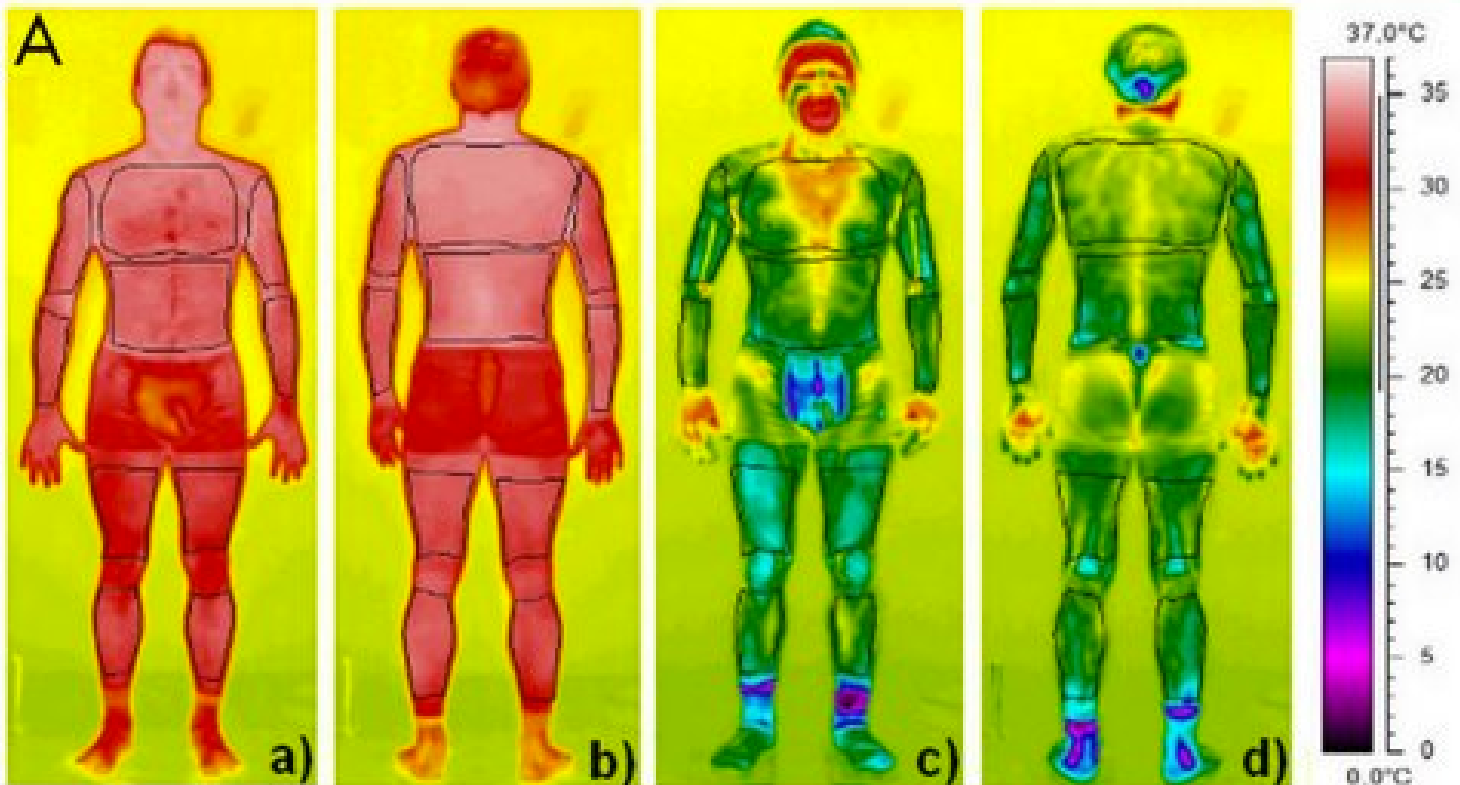
FEBRUARY 2023

[Click for Full Text  
\(Costello et al. 2015\)](#)

JBI 11/11 [100%]



This systematic review assessed the effects (benefits and harms) of whole-body cryotherapy (extreme cold air exposure) for preventing and treating muscle soreness after exercise in adults.



# KEY FINDINGS

**4 RCTs included; 64 athletes participated**  
**2 trials were parallel group, 2 were crossover trials**

## WBC vs Control or Far-infrared therapy:

Very low quality evidence for lower self-reported muscle soreness (pain at rest) scores after WBC at 1, 24, & 48 hours.

No between-group differences.

No difference in tiredness but better well-being after WBC at 24hr.

No report of adverse events.

Very low quality evidence of lower levels of muscle soreness after WBC vs infrared therapy, at 1 hour follow-up, but not at 24 or 48 hours.

# MAIN TAKEAWAYS

There is insufficient evidence from RCTs to determine whether whole-body cryotherapy (WBC) reduces self-reported muscle soreness, or improves subjective recovery, after exercise.

There is no evidence on adverse events nor on the use of this intervention in females or elite athletes.

There is insufficient evidence to draw any conclusions on the relative effects of WBC versus far-infrared therapy.

There is no evidence on effects of WBC vs other active interventions such as cold water immersion, or on the best protocol for WBC.

# GIVE US YOUR FEEDBACK!

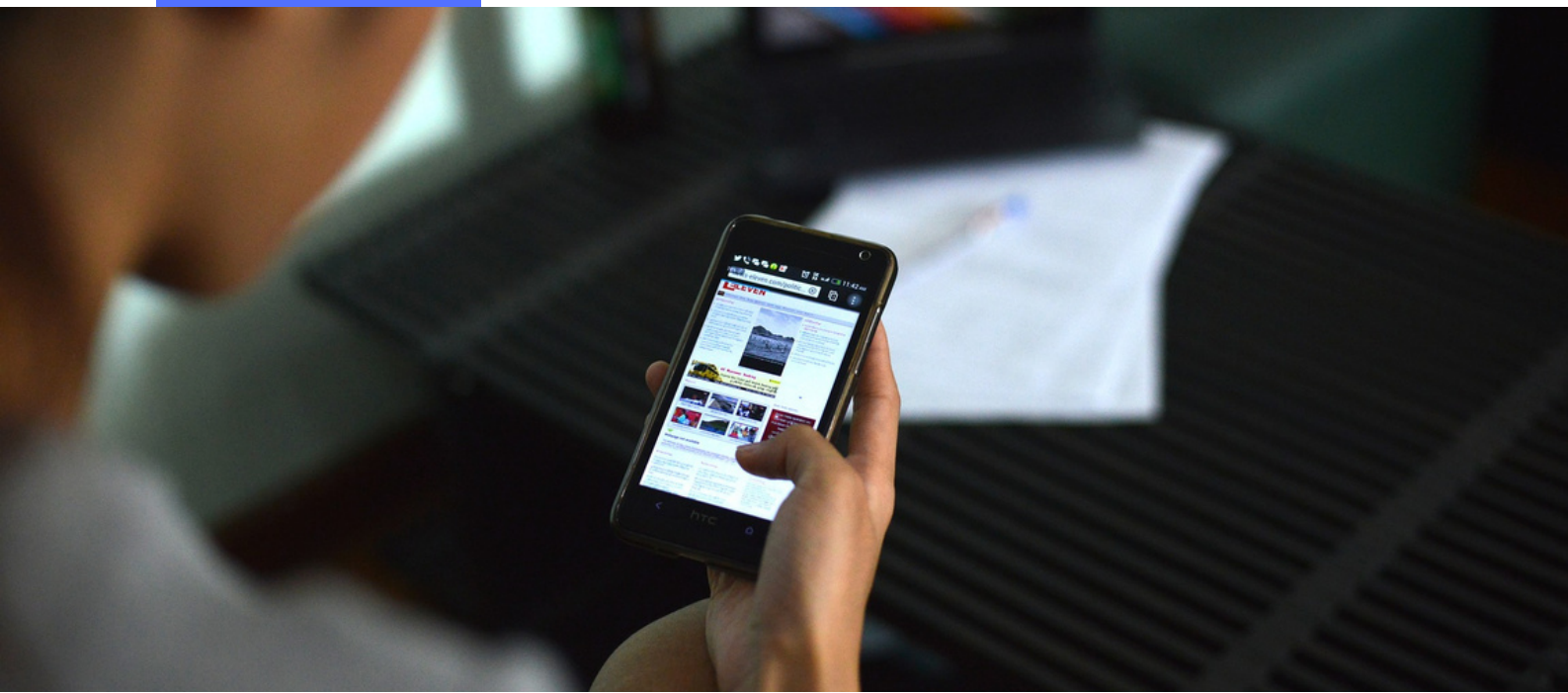
## MEMBERS

We are on a mission to make research more accessible, easier to interpret, and quicker to implement.

Help us by giving 1 minute of your time to leave feedback for us.

We would greatly appreciate any feedback you have, as it helps us continually improve!

[Leave Review](#)





## JBI CRITICAL APPRAISAL CHECKLIST FOR SYSTEMATIC REVIEWS AND RESEARCH SYNTHESSES

Author: Afonso et al. Year: 2021

	Yes	No	Unclear	Not applicable
1. Is the review question clearly and explicitly stated?	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were the inclusion criteria appropriate for the review question?	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Was the search strategy appropriate?	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Were the sources and resources used to search for studies adequate?	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Were the criteria for appraising studies appropriate?	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Was critical appraisal conducted by two or more reviewers independently?	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Were there methods to minimize errors in data extraction?	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Were the methods used to combine studies appropriate?	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Was the likelihood of publication bias assessed?	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Were recommendations for policy and/or practice supported by the reported data?	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Were the specific directives for new research appropriate?	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Overall appraisal: 11/11 (100%)**

LIMITATIONS:

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Limited number of studies; high RoB, high heterogeneity and poor external validity were all limitations.

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Included studies solicited extremely varied stretching intensities, but all were based in vague sentences to suggest the subjects the degree of stretching intended.

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## JBI CRITICAL APPRAISAL CHECKLIST FOR SYSTEMATIC REVIEWS AND RESEARCH SYNTHESSES

Author: Ranchordas et al. Year: 2017

	Yes	No	Unclear	Not applicable
1. Is the review question clearly and explicitly stated?	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were the inclusion criteria appropriate for the review question?	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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11. Were the specific directives for new research appropriate?	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Overall appraisal: 11/11 (100%)**

LIMITATIONS:

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No data were included from highly trained elite athletes. Most trial participants were male and active or moderately trained.

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High risk of selective bias reporting.

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No studies included adverse effects.

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## JBI CRITICAL APPRAISAL CHECKLIST FOR SYSTEMATIC REVIEWS AND RESEARCH SYNTHESSES

Author: Costello et al. Year: 2015

	Yes	No	Unclear	Not applicable
1. Is the review question clearly and explicitly stated?	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Were the inclusion criteria appropriate for the review question?	+	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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**Overall appraisal: 11/11 (100%)**

LIMITATIONS:

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Lack of blinding results in a high risk of bias.

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Imprecision reflecting the very small sample size.

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Where pooling was possible, inconsistency reflecting substantial heterogeneity.

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