RESEARCH MADE SIMPLE

Hydrogen-rich water bathing after intense exercise

A clear summary of a 2020 pilot study on muscle damage and soreness

The short answer: Encouraging, but very early evidence. After strenuous leg exercise, six young men reported a greater reduction in soreness following a hydrogen-rich water bath than after a normal bath. One key blood marker of muscle damage, creatine kinase (CK), also responded more favourably.

What did the researchers do?

6 participants Healthy, active men; average age 24	Crossover study Every man tried both baths, two weeks apart
Exercise Heavy eccentric leg presses designed to cause DOMS	Bath 30 minutes, immersed to the neck, immediately after exercise

The hydrogen bath contained 8 mg of dissolved H2 per litre in a 200-litre bath at 28°C. The control bath contained no hydrogen. The trial was described as double-blind; control tablets produced bubbles to help the baths look similar.

What did the study find?

Outcome	What happened	Plain-English meaning
Muscle soreness	Soreness fell by 32.7% after the hydrogen bath vs 20.0% after control; at 24 hours, reductions were 31.6% vs 22.4%.	Participants reported a greater reduction in soreness after the hydrogen bath at both time points.
Creatine kinase (CK)	CK remained close to baseline after the hydrogen bath (343 to 357 U/L) but rose after control (343 to 465 U/L). The time-by-treatment comparison was significant (P=0.04).	This blood marker responded more favourably after hydrogen bathing, suggesting less exercise-related muscle stress or enzyme leakage.
Other blood markers	Aldolase and AST rose after the control bath but stayed near baseline after hydrogen. Between-treatment effects for these and the remaining markers were not statistically significant.	Several readings looked favourable, but CK was the only muscle-damage marker with a significant treatment comparison.
Safety	No major side effects were reported. One participant felt brief mild burning when a partly dissolved tablet touched his skin.	The single bath was generally well tolerated in this very small group.

WHAT THE RESULTS REALLY MEAN

Interesting pilot results - not proof

Why the findings matter

Eccentric exercise - when a muscle lengthens under load - often causes delayed onset muscle soreness (DOMS). This study explored whether molecular hydrogen could be delivered through the skin during a bath as a recovery method.

The crossover design was useful because each participant acted as his own comparison. The more favourable CK response and lower soreness ratings justify larger studies.

What the study did not prove

It did not establish that hydrogen bathing speeds functional recovery, improves strength or performance, prevents injury, or works better than established recovery methods. These outcomes were not measured.

Important limitations

- Only six men participated.
- There was only one bath and 24 hours of follow-up.
- Results may not apply to women, older adults, injured people or other types of exercise.
- Most blood-marker comparisons were not statistically significant.
- The mechanism remains uncertain.
- The tablet supplier helped fund the study, although the authors declared no conflicts of interest.

Best interpretation

A single supersaturated hydrogen-rich water bath was associated with less perceived soreness and a more favourable CK response after intense leg exercise. Because this was an extremely small pilot study, the result should be viewed as a reason for further research, not a confirmed recovery benefit.

Quick glossary

DOMS	Delayed muscle soreness, usually felt 24-48 hours after unfamiliar or intense exercise
CK	Creatine kinase, an enzyme that can rise in the blood after muscle stress or damage
VAS	Visual Analogue Scale, a simple rating used to record how sore a person feels
Crossover	A design in which the same people receive both interventions on different occasions

Original research Todorovic N, Javorac D, Stajer V, Ostojic SM. The Effects of Supersaturated Hydrogen-Rich Water Bathing on Biomarkers of Muscular Damage and Soreness Perception in Young Men Subjected to High-Intensity Eccentric Exercise. Journal of Sports Medicine. 2020:8836070. DOI: 10.1155/2020/8836070