

Protein and carb intake post-exercise can benefit bone health, study finds

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The findings have the potential to influence athletes' dietary and training practices. Credit: Nottingham Trent University

Protein and carbohydrate intake after exercise can have a beneficial impact on bone health and could help to stave off serious injury among athletes, new research suggests.

A study led by sport scientists at Nottingham Trent University showed that drinking a protein and carbohydrate-rich solution after strenuous exercise helped decrease [bone resorption](#) – the breakdown of tissue in the [bone](#).

It also had a small positive impact on [bone formation](#), creating a better balance of bone turnover – which at high levels is also associated with

[bone loss](#) and damage.

It is known that prolonged and intense exercise causes increased resorption of the bone – which is linked to the occurrence of debilitating [stress fracture](#) injuries in athletes. Such injuries can see athletes out of action for months, resulting in major losses in training time or missed competitions.

The researchers, writing in the journal *Medicine & Science in Sports & Exercise*, say the findings have the potential to influence athletes' dietary and training practices.

As part of the study male endurance runners ran on a treadmill until exhaustion – and had their blood collected before and after exercise, to measure the impact upon [bone health](#) biomarkers. Participants drank either a placebo or a protein and carbohydrate solution developed by the researchers.

The scientists found that the solution reduced concentrations of the b-CTX biomarker – which is released into the blood stream during bone resorption – whether it was ingested immediately or two hours after exercise.

Those who had the solution immediately after exercise also showed increases in P1NP, a blood biomarker for bone formation, four hours after exercise.

Previous work has looked at effects of nutrition before and during exercise, but this is not always practical and can lead to gastrointestinal discomfort.

A key benefit of drinking a solution in this context is that it is quick and easy for the athlete to ingest. It would probably take longer to see any

similar benefit from eating protein and carbohydrate-rich food, due to the additional time taken for transit through the gut.

"Given that endurance athletes train multiple times a day, preventing bone loss and stress fracture injury is hugely important," said Craig Sale, Professor of Human Physiology in Nottingham Trent University's School of Science and Technology.

He said: "These athletes have minimal recovery time and rest days and are likely to suffer in terms of bone health, with increased risk of injury. These findings are important for those individuals because post-[exercise](#) intake, or training sessions, can be timed so that training occurs when bone resorption is at its lowest and bone formation at its highest."

Researcher Becky Townsend added: "Although the study was performed with elite athletes in mind, the data could also be used by sub-elite or recreational endurance athletes training just once a day.

"The data may also be useful for athletes that perform a variety of different training sessions; from long slow runs, to high-intensity interval type sessions, as all of these types of sessions include repetitive mechanical loading and cause increased physiological/hormonal responses.

"Although the carbohydrate and protein drink used in the study was individualised based on participant body weight, there are a number of similar carbohydrate and protein recovery drinks that are commercially available."

The study also involved the English Institute of Sport and Norwich Medical School at the University of East Anglia.

Dr Kevin Currell, Director of Science and Technical Development at the

English Institute of Sport, said: "Working with Nottingham Trent University to find a simple intervention which could support [elite athletes](#) bone health has been an impactful partnership. This research has already been put into practice, and helped keep a number of [athletes](#) fit and healthy leading into Rio 2016."

More information: Rebecca Townsend et al. The Effect of Postexercise Carbohydrate and Protein Ingestion on Bone Metabolism, *Medicine & Science in Sports & Exercise* (2017). [DOI: 10.1249/MSS.0000000000001211](#)

Provided by Nottingham Trent University

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