

Post-Exercise Meal

Eating After Exercise

What to eat after exercise to replenish muscle glycogen

By Elizabeth Quinn - Health's Disease and Condition content is reviewed by Medical Review Board

All athletes know of the importance of the pre-exercise meal. However, what and when you eat following exercise can be just as important. While the pre-exercise meals can ensure that adequate glycogen stores are available for optimal performance, the post-exercise meal is critical to recovery and improves your ability to train consistently.

Hydration After Exercise

The first nutritional priority after exercise is to replace any fluid lost during exercise. In general the best way to determine how much to drink (either water or a sports drink) is to:

- Weigh yourself before and after exercise and replace fluid losses.
- Drink 20-24 fl oz water for every 1 lb lost.

Eating After Exercise

It is also important to consume carbohydrate, such as fruit or juice) within 15 minutes post-exercise to help restore glycogen.

Research has shown that eating 100-200 grams of carbohydrate within two hours of endurance exercise is essential to building adequate glycogen stores for continued training. Waiting longer than two hours to eat results in 50 percent less glycogen stored in the muscle. The reason for this is that carbohydrate consumption stimulates insulin production, which aids the production of muscle glycogen. However, the effect of carbohydrate on glycogen storage reaches a plateau.

Carbohydrate Plus Protein Speeds Recovery

Research shows that combining protein with carbohydrate in the two hours after exercise nearly doubles the insulin response, which results in more stored glycogen. The optimal carbohydrate to protein ratio for this effect is 4:1 (four grams of carbohydrate for every one gram of protein). Eating more protein than that, however, has a negative impact because it slows rehydration and glycogen replenishment.

One study found that athletes who refueled with carbohydrate and protein had 100 percent greater muscle glycogen stores than those who only ate carbohydrate. Insulin was also highest in those who consumed a carbohydrate and protein drink.

Protein Needs After Exercise

Consuming protein has other important uses after exercise. Protein provides the amino acids necessary to rebuild muscle tissue that is damaged during intense, prolonged exercise. It can also increase the absorption of water from the intestines and improve muscle hydration. The amino acids in protein can also stimulate the immune system, making you more resistant to colds and other infections.

Bottom Line

If you are looking for the best way to refuel your body after long, strenuous endurance exercise, a 4:1 combo of carbohydrate and protein seems to be your best choice. While solid foods can work just as well as a sports drink, a drink may be easier to digest make it easier to get the right ratio and meet the 2-hour window.

Source

Betts JA, et al. [Effects of recovery beverages on glycogen restoration and endurance exercise performance](#) Williams MB, et al. Effects of recovery beverages on glycogen restoration and endurance exercise performance. *J Strength Cond Res.* 2003 Feb;17(1):12-9.

Ivy JL, Goforth HW Jr, Damon BM, McCauley TR, Parsons EC, Price TB. [Early postexercise muscle glycogen recovery is enhanced with a carbohydrate-protein supplement.](#) *J Appl Physiol.* 2002 Oct;93(4):1337-44.

Zawadzki KM, Yaspelkis BB 3rd, Ivy JL. [Carbohydrate-protein complex increases the rate of muscle glycogen storage after exercise.](#) *J Appl Physiol.* 1992 May;72(5):1854-9.

Res, P., Ding, Z., Witzman, M.O., Sprague, R.C. and J. L. Ivy. [The effect of carbohydrate-protein supplementation on endurance performance during exercise of varying intensity.](#) *International Journal of Sports Nutrition and Exercise Metabolism.*

Levenhagen DK, Carr C, Carlson MG, Maron DJ, Borel MJ, Flakoll PJ. Post exercise protein intake enhances whole-body and leg protein accretion in human. *Medicine and Science in Sports & Exercise.* 2002 May; 34(5): 828-37.

Miller SL, Tipton KD, Chinkes DL, Wolf SE, Wolfe RR. Independent and combined effects of amino acids and glucose after resistance exercise. *Medicine & Science in Sports & Exercise.* 2003 March; 35(3):449-55.