



## **Fueling the Extra Mile: Proper Nutrition for Endurance Athletes**

Student athletes participating in endurance activities require year-round training and a nutritional plan to match. As the training cycle transitions through the various phases—preparation, pre-race, race, and active recovery—so does the nutritional prescription.

During the race phase, the main goal is to provide enough energy for daily activities and exercise in addition to replacing glycogen stores and repairing lean muscle mass. The focus should be on eating often, making sure the diet is adequate in total energy, vitamins, and minerals, timing the nutrition plan properly around activity (pre-, during, and post-exercise), and hydrating properly.

### ***Determining Nutritional Needs for Endurance Athletes***

#### ***Carbohydrate***

The overall energy needs for endurance athletes are high, with carbohydrates being the primary source of fuel. Athletes must consume enough carbohydrates daily to replenish muscle glycogen that is used during training. Carbohydrate intake should range from 5 to 7 g/kg for moderate-duration and low-intensity training, and 7 to 12 g/kg for moderate to heavy training. (1) Adjustments to these general recommendations should be individualized to each athlete based on intensity, level of training, body size, and gender.

#### ***Protein***

In addition to adequate energy and carbohydrate intake, intact, high-quality proteins such as whey, casein, or soy are effectively used for the maintenance, repair, and synthesis of skeletal muscle. General protein recommendations for endurance athletes range from 1.2 to 1.4 g/kg. (1) While obtaining an adequate amount of protein each day is fundamentally important, athletes should not overlook the importance of the timing of protein intake throughout the day, especially after exercise (refer to article Eating Frequency).

#### ***Fat***

Fat is an important nutrient for endurance athletes because it is a primary energy source at rest and during low-intensity activity. Along with carbohydrate, endurance athletes can use fat as an important energy source for moderate-intensity exercise. Fat intake will depend on the total energy needs, but in general ranges between 0.8 to 1.0 g/kg. (1) Athletes should be encouraged to increase their intake of healthy unsaturated fats and decrease their intake of saturated fats.

#### ***Iron***

Endurance athletes, particularly females, are at high risk of low iron status due to both

increased losses (via sweat, red blood cell damage, gastrointestinal bleeding, and menstruation) and inadequate dietary iron intake. (2) Iron requirements for endurance athletes, especially distance runners, are increased by approximately 70% (3). Athletes who are vegetarian or regular blood donors should aim for an iron intake greater than their respective RDA, >18 mg and >8 mg, for woman and men, respectively (3).

### ***Carbohydrate Loading***

Because muscle glycogen depletion is a well-recognized limitation to endurance performance, some endurance athletes may benefit from carbohydrate loading. This technique has been shown to increase muscle glycogen stores from resting levels of 100 to 120 mmol/kg to 150 to 250 mmol/kg and improve performance in endurance events exceeding 90 minutes. (1) Unfortunately, research indicates that many athletes who attempt to carbohydrate load fail to achieve their goal based on common mistakes. Referral to a sports dietitian can help.

### ***Building the Training Diet- Ways to Fuel and Preparing the Body for Activity***

Once an athlete determines the total amount for carbohydrate, protein, and fat that they need, it's time to distribute the nutrition over the course of the day. The amount and timing of carbohydrates before, during, and after exercise should be considered in the context of the total dietary intake over days, weeks, and months. Daily intake will vary but over time both energy and carbohydrate intake must be adequate. If it is not, training and performance will be affected. Students can refer to the collegiate student-athlete facts sheets for more information.

A sports dietitian can help an athlete turn their specific recommendations into practical meal plans, including examples of what, when, and how much food and fluid to consume at any given time.

### ***Author***

Written by SCAN Registered Dietitians (RDs). For advice on customizing a nutrition plan, consult a RD who specializes in sports, particularly a Board Certified Specialist in Sports Dietetics (CSSD). Find a SCAN RD at [www.scandpg.org](http://www.scandpg.org).

### ***References***

- 1.) Sports, Cardiovascular, and Wellness Nutritionists DPG, Rosenbloom C Coleman E. Sports Nutrition: A Practice Manual for Professionals, 5<sup>th</sup> edition. Sports Cardiovascular and Wellness Nutrition Dietetic Practice Group. Academy of Nutrition and Dietetics, Chicago: 2012.
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- 3.) Rodriguez NR, DiMarco NM, Langley S. Position of the American Dietetic Association, Dietitians of Canada, and the American College of Sports Medicine: Nutrition and Athletic Performance. *Journal of the American Dietetic Association*. 2009;109:509-27.