

WELLNESS UPDATE 2004, #5

CARBOHYDRATES AND ATHLETIC PERFORMANCE

There has been much hype in the media lately about the possible benefits of low-carbohydrate diets. While a low-carbohydrate diet may be beneficial for short term weight loss in obese people, **low-carbohydrate diets are NOT recommended for athletes**. A person's ability to exercise at a high intensity level, and to recover from intense exercise, is directly related to daily carbohydrate intake. **A low-carbohydrate diet is detrimental to an athlete during high intensity exercise as their endurance is reduced and their ability to recover from high intensity exercise is impaired.**

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High carbohydrate foods are needed to replace muscle glycogen (energy) used during exercise. **A high carbohydrate diet is essential when trying to delay the depletion of the body's energy reserves.** Even on a high carbohydrate diet, depending on the intensity and duration of the activity, muscle glycogen can be depleted in as little as 10-20 minutes. When consuming a high carbohydrate diet, it takes at least 24 hours to replace muscle glycogen after intense exercise. It takes much longer when consuming a low carbohydrate diet.

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Athletes generally require that 60% of their total daily, caloric intake come from carbohydrates. This is equivalent to about 4.5 grams of carbohydrate per pound of body weight. For a 160-pound athlete, that equals about 720 calories per day from carbohydrate. That is equivalent to approximately 8-10 servings of fruits, vegetables & fruit juices; 8-10 servings of breads, grains, rice & pasta; & 4-6 servings of low-fat dairy products. High quality carbohydrates are the best choices when consuming a high carbohydrate diet. **High quality carbohydrates include fruits, vegetables, pasta, rice, legumes, 100% fruit juices, whole-wheat grain products, and low-fat**

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The following are some examples of foods containing high quality carbohydrates:

Fruits: (Fresh, frozen, canned, or dried)

Apples	Fruit cocktail	Grapes	Pineapple
Applesauce	Fruit salad	Kiwi	Plums
Apricots	Fruit Roll-ups	Oranges	Raisins
Bananas	Fruit juices	Peaches	Strawberries
Cantaloupe	Grapefruit	Pears	Watermelon

Vegetables & legumes: (Fresh, frozen, or canned) Fresh or frozen vegetables are higher in nutrients than canned and excessive cooking can reduce their nutrient content.

Asparagus	Cauliflower	Dried peas	Sweet potatoes
Baked beans	Celery	Green beans	Tomatoes
Baked potatoes	Chili	Green peppers	Tomato sauce
Boiled potatoes	Coleslaw	Peas	Vegetable juices
Broccoli	Corn	Spinach	Zucchini
Carrots	Dried beans		

Breads, Grains, and Cereals: Thicker, heavier, whole-grain breads have more carbohydrate than thinner, lighter breads. This makes them slightly higher in calories, but those are nutritious calories that can be used for sustained energy as well as providing a good source of vitamins and minerals. A nutritious goal is to eat whole-grain products one-half of the time. Cold cereals that are fortified with vitamins and minerals are also excellent sources of energy.

Angel Food cake	Corn bread	Macaroni	Rice cakes
Animal crackers	Crackers	Muffins, with fruit	Sandwich buns
Bagels	Dinner rolls	Noodles	Spaghetti
Biscuits	English muffins	Pancakes	Stuffing
Bran muffins	Fruit bars (i.e.,	Pita Bread	Thick crust pizza
Bread	Fig bars)	Popcorn (lightly	Tortillas
Brownies	Ginger Snaps	buttered),	Vanilla wafers
Cereal party mix	Granola bars	Pretzels	Waffles
Cold cereal	Hot cereal	Rice	

Dairy Products: (Choose low-fat whenever possible.)

Cheese
Cottage Cheese
Frozen Yogurt
Ice cream
Ice milk - this contains half the fat of ice cream
Milk, white or chocolate - choose low fat, when possible
Pudding
String Cheese
Yogurt, fruit added - choose low fat when possible

Another important factor in consuming enough carbohydrate is the timing of when foods containing carbohydrate are consumed. If carbohydrate is consumed during exercise, it may be best to do so in liquid form. Sports drinks work well during exercise as they are easy to use and typically contain 6%-8% carbohydrate, or about 50 calories per 8-ounce serving. This amount of carbohydrate can easily be utilized by the body during exercise without triggering an insulin response which may reduce energy levels. One of the best times to replace carbohydrate expended during exercise is within 30-minutes after exercise. Bagels, fruit, pretzels, juice or sports drinks are convenient ways to accomplish this.

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In summary, while the jury is still out on the benefit of low-carbohydrate diets among an obese population, **low-carbohydrate diets are NOT recommended for athletes.** An athlete's major energy source is carbohydrate and **depriving the body of carbohydrate will certainly result in decreased athletic performance.**

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Sources: “Eat to Fuel Your Performance,” Jeff Louck, RD., Iowa State University Extension, 1997; “First-Class Fuels,” Julie Burns, M.S., RD., Gatorade Sports Science Institute, 2002; “Highs and Lows of Carbohydrates Diets,” Edward Coyle, Ph.D., FACSM, Gatorade Sports Science Institute, Volume 17, Number 2, 2004; “NISMAT Sports Nutrition Corner: Carbohydrate,” Nicholas Institute of Sports Medicine and Athletic Trauma, 2002; “Sports Nutrition for High School Athletes,” Robin Hamre, RD., LD, Iowa Beef Industry Council, 1997; Sports Nutrition Guidebook, Nancy Clark, RD., Human Kinetics Publishing, 1997; “Sports Nutrition Myths,” Christine Rosenbloom, Ph.D., R.D., Gatorade Sports Science Institute, 2002; “The Edge,” Mark Hargraves, Ph.D., Gatorade Sports Science Institute, 2002.