

Proper nutrition for sports performance

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HOUSTON – Although proper diet and nutrition is important for everyone, athletes who are involved in competitive sports and endurance training have different needs than others, according to a sports medicine expert at Baylor College of Medicine (www.bcm.edu).

“If you’re actively working out, training at a high volume or preparing for a competition, you really need to take in enough calories and nutrients to support the level of activity that you’re doing,” said Dr. Theodore Shybut, assistant professor of orthopedic surgery at BCM. “For an average person, the daily caloric intake might be 1,800 to 2,000 calories. An athlete who is a competitive heavyweight rower or training for long distance running races, for example, may need to eat two or three times that amount of calories daily.”

For those athletes who are injured and are taking a break from training, Shybut says to bring the caloric intake down appropriately.

A high carbohydrate diet has shown to be important for performance in endurance events lasting more than 90 minutes, particularly two to three days before the event. Examples of complex carbohydrates that should be consumed include whole-grain bread, pasta, cereal and brown rice.

However, Shybut advises that these athletes not skimp on other nutrients during their day-to-day training.

“You want to be sure you’re getting enough protein, which is important for rebuilding tissue from the breakdown that occurs during exercise,” Shybut said. “So-called ‘healthy fats’ such as Omega-3 fatty acids are also part of a balanced diet.”

He also emphasizes the importance of proper fluid intake since performance will suffer if the body is dehydrated. Sports drinks containing electrolytes can replenish some carbohydrates and are good for performance in high intensity endurance sports, he said.

“If you are training at high volume and high intensity, you shouldn’t skip these sports drinks because you’re worried about extra calories. When you’re competing at that level of intensity, you need the caloric support,” he said.

One of the common mistakes Shybut identifies, especially in junior high and high school athletes, is skipping meals. Eating regular meals is an important part of a training routine, he said.

Another mistake that Shybut commonly sees is athletes not eating enough fruits and vegetables because they are focusing on consuming carbohydrates and protein. Research has shown that antioxidants in fruits and vegetables can be helpful in the recovery of day-to-day training.

Although caffeine can increase performance in endurance events, Shybut recommends that it be used carefully. If an athlete has never consumed caffeine during training, Shybut advises that they not try it out on game day for the first time.

Shybut suggests that if the sporting event or competition is late in the day, eat a meal high in carbohydrates about three hours prior to the event. Don't consume foods that are hard to digest, such as those high in fat or protein, right before competition. "Your body will have to work to digest the food as opposed to pumping blood to working muscles," he said.

Breakfast is a common meal that is skipped, but Shybut emphasizes that if the event is not right after breakfast, it's a good meal to get some protein in the body. Breakfast is also important for the brain, which uses glucose as well. A sharp brain is important in the arena of sports competition, Shybut said.

Questions:

What is the caloric intake required for athletes? Why do you think it could vary so much?

Why is it important to maintain high levels of protein as an athlete?

What do fruits and vegetables provide for student athletes?

According to Shybut, what type of meal should you eat on game day?

Nutrition for the Athlete

by J. Anderson, L. Young and S. Prior¹ (12/10)

Quick Facts...

- Athletes achieve peak performance by training and eating a variety of foods.
- Athletes gain most from the amount of carbohydrates stored in the body.
- Fat also provides body fuel; use of fat as fuel depends on the duration of the exercise and the condition of the athlete.
- Exercise may increase the athlete's need for protein.
- Water is a critical nutrient for athletes. Dehydration can cause muscle cramping and fatigue.

Carbohydrates

Athletes benefit the most from the amount of carbohydrates stored in the body. In the early stages of moderate exercise, carbohydrates provide 40 to 50 percent of the energy requirement. As work intensity increases, carbohydrate utilization increases.

Complex carbohydrates come from foods such as spaghetti, potatoes, lasagna, cereals and other grain products. Simple carbohydrates are found in fruits, milk, honey and sugar. During digestion, the body breaks down carbohydrates to glucose and stores it in the muscles as glycogen. The ability to sustain prolonged vigorous exercise is directly related to initial levels of muscle glycogen. If the event lasts for less than 90 minutes, the glycogen stored in the muscle is enough to supply the needed energy.

For events that require heavy work for more than 90 minutes, a high-carbohydrate diet eaten for two to three days before the event allows glycogen storage spaces to be filled. Long distance runners, cyclists, cross-country skiers, canoe racers, swimmers and soccer players report benefits from a precompetition diet where 70 percent of the calories comes from carbohydrates. According to the Olympic Training Center in Colorado Springs, endurance athletes on a high-carbohydrate diet can exercise longer than athletes eating a low-carbohydrate, high-fat diet. Eating a high-carbohydrate diet constantly is not advised.

A diet where 70 percent of calories comes from carbohydrates for three days prior to the event is sometimes helpful for endurance athletes. Water retention often is associated with carbohydrate loading. This may cause stiffness in the muscles and sluggishness early in the event. A three-day regimen minimizes this effect.

Water

Water is an important nutrient for the athlete. Athletes should start any event hydrated and replace as much lost fluid as possible by drinking chilled liquids at frequent intervals during the event. Chilled fluids are absorbed faster and help lower body temperature.

Fats

Fat also provides body fuel. For moderate exercise, about half of the total energy expenditure is derived from free fatty acid metabolism. If the event lasts more than an hour, the body may use mostly fats for energy. Using fat as fuel depends on the event's duration and the athlete's condition. Trained athletes use fat for energy more quickly

than untrained athletes. Consumption of fat should not fall below 15 percent of total energy intake because it may limit performance. Athletes who are under pressures to achieve or maintain a low body weight are susceptible to using fat restriction and should be told that this will hinder their performance.

Fat may contribute as much as 75 percent of the energy demand during prolonged aerobic work in the endurance-trained athlete.

Protein

After carbohydrates and fats, protein provides energy for the body. Exercise may increase an athlete's need for protein, depending on the type and frequency of exercise. Extra protein consumed is stored as fat. In the fully grown athlete, it is training that builds muscle, not protein per se. The ADA reports that a protein intake of 10 to 12 percent of total calories is sufficient.

Vitamins and Minerals

Increased caloric intake through a varied diet ensures a sufficient amount of vitamins and minerals for the athlete. There is no evidence that taking more vitamins than is obtained by eating a variety of foods will improve performance. Thiamin, riboflavin and niacin (B vitamins) are needed to produce energy from the fuel sources in the diet. However, plenty of these vitamins will be obtained from eating a variety of foods. The body stores excess fat-soluble vitamins A, D, E and K. Excessive amounts of fat-soluble vitamins may have toxic effects.

Minerals play an important role in performance. Heavy exercise affects the body's supply of sodium, potassium, iron and calcium. Sweating during exercise increases the concentration of salt in the body. Consuming salt tablets after competition and workouts is not advised as this will remove water from your cells, causing weak muscles. Good sodium guidelines are to: 1) avoid excessive amounts of sodium in the diet and 2) beverages containing sodium after endurance events may be helpful. Eating potassium-rich foods such as oranges, bananas and potatoes throughout training and after competition supplies necessary potassium.

Iron carries oxygen via blood to all cells in the body and is another important mineral for athletes. Female athletes and athletes between 13 and 19 years old may have inadequate supplies of iron due to menstruation and strenuous exercise.

Calcium is an important nutrient for everyone as it is important in bone health and muscle function. Female athletes should have an adequate supply of calcium to avoid calcium loss from bones. Calcium loss may lead to osteoporosis later in life. Choosing low-fat dairy products, provide the best source of calcium.

The Pre-Game Meal

A pre-game meal three to four hours before the event allows for optimal digestion and energy supply. Most authorities recommend small pre-game meals that provide 500 to 1,000 calories.

The meal should be high in starch, which breaks down more easily than protein and fats. The starch should be in the form of complex carbohydrates (breads, cold cereal,

pasta, fruits and vegetables). They are digested at a rate that provides consistent energy to the body and are emptied from the stomach in two to three hours. High-sugar foods lead to a rapid rise in blood sugar, followed by a decline in blood sugar and less energy. In addition, concentrated sweets can draw fluid into the gastrointestinal tract and contribute to dehydration, cramping, nausea and diarrhea. Don't consume any carbohydrates one and a half to two hours before an event. This may lead to premature exhaustion of glycogen stores in endurance events. Avoid a meal high in fats. Fat takes longer to digest as does fiber- and lactose-containing meals. Take in adequate fluids during this pre-game time. Avoid caffeine (cola, coffee, tea) as it may lead to dehydration by increasing urine production.

The Post-Game Meal

Regardless of age, gender or sport, the post-game.competition meal recommendations are the same. Following a training session or competition, a small meal eaten within thirty minutes is very beneficial. The meal should be mixed, meaning it contains carbohydrate, protein, and fat. Protein synthesis is greatest during the window of time immediately following a workout and carbohydrates will help replete diminished glycogen stores. However, consume food within the 30 minute window may be difficult for athletes—they often experience nausea or lack of hunger. Options to address this difficulty include:

- Carbs you can drink that contain protein. There are several liquid smoothies and beverages on the market that provide high protein and carbohydrates for replenishment. One classic is chocolate milk.
- If that is difficult, fruit, popsicles, oranges, bananas, bagels, melon, or apple slices all would be better than not consuming any food.

Use the above information to answer the following questions:

Nutrient	What they do for athletes/ why they are important	How much should you eat?
Carbohydrates		
Fats		
Proteins		
B- Vitamins		/
Sodium		/
Calcium		/
Iron		/

Describe why a pre-game meal is important and what it should consist of:

Describe why a post-game meal is important and what it should consist of: