

Carbohydrates and Athletic Performance

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Carbohydrates are one of the most important nutrients an athlete can consume. Carbohydrates provide the energy needed to help athletes reach their peak athletic potential during vigorous training sessions or when competing.

What is a carbohydrate?

There are different types of carbohydrates, or “carbs,” including simple sugars, complex carbohydrates, and fiber. Once digested, complex carbohydrates are broken down into sugar, mainly glucose, and used for physical activity. The body can use the glucose as immediate energy or store it in the muscle and liver. This stored carbohydrate is called glycogen. Carbohydrates are the main fuel source our muscles use during physical activity, especially high intensity activity, which make them important for fueling exercise.

How do carbohydrates enhance athletic performance?

During intense physical activity, the muscles and brain need a quick and readily available fuel source (energy) to maintain high levels of performance. Eating plenty of carbohydrates keeps blood sugar from getting too low, which would make you tired and sluggish, and having enough

stored glycogen for fuel. This is why carbohydrates allow you to perform at high intensities longer. Carbohydrates also play an important role in the muscle recovery after exercise by refilling your muscle’s glycogen stores.

When should I consume carbohydrates?

Eating carbohydrates is important before, after, and sometimes during strenuous



exercise or competition. Before participating in an endurance sport, eating more carbohydrates can maximize glycogen stores in your muscles and liver. To do this, eat more high-carbohydrate foods (Table 1) 1 to 2 days before your competition or event. During a training session or while competing, ingesting carbohydrates can help you perform at maximum intensities for a longer period of time by keeping blood sugar from lowering too much, although this is only useful for training sessions or competitions lasting over an hour. After training or competing, eating carbohydrates can help you replenish glycogen stores and enhance muscle recovery.

What types of carbohydrates should I eat?

Carbohydrates commonly are grouped as either “simple” carbohydrates or “complex” carbohydrates. Simple carbohydrates can come in a natural form as found in fruit and milk, but the majority of them come in the form of added sugars and processed grains, such as white flour. Some common examples of foods containing simple carbohydrates are candy, packaged snack foods, white bread, fruit drinks, sports drinks, and soda. While eating simple carbohydrates may prove beneficial during exercise, the vast majority of your carbohydrate consumption should come from com-

plex carbohydrates. Complex carbohydrates take longer to digest and absorb, which gives you a longer source of energy to use than simple carbohydrates. Table 1 displays some common examples of simple and complex carbohydrates.

How many carbohydrates should I eat?

According to the Academy of Dietetics and Nutrition, carbohydrates should constitute 45-65 percent of one’s daily energy intake (calories). For a 2,000-calorie diet, this would be 225-325 grams of carbohydrates. However, carbohydrate consumption can vary from different exercise activity as shown

Table 1. Amount of carbohydrate found in some commonly eaten foods. Remember, the majority of your carbohydrate consumption should come from the complex variety.

Carbohydrate	Type of carbohydrate	Amount per serving
Sweet potato	complex	24 grams per potato
Oatmeal	complex	27 grams per cooked cup
Whole-wheat pasta	complex	32 grams per cooked cup
Brown rice	complex	45 grams per cooked cup
Sports drinks (Regular)	simple	21 grams per 12 oz bottle
Milk	simple	12 grams per cup
Whole-wheat bread	complex	12 grams per slice
Apple	mix	25 grams per apple
Banana	mix	27 grams per banana
Soft drink	simple	39 grams per 12 oz can
White bread (not whole-grain)	simple	26 grams per slice

Table 2. Recommendations for carbohydrate intake for different sports.

Exercise Intensity and Duration	Examples of Sports	Daily Carbohydrate Recommendation
Very high intensity, very short duration (less than 1 minute)	Field events (shot put, discus, or high jump), Track sprints (50-200 m), Swimming sprints (50-100 m), Sprint cycling (200 m), weightlifting	2.28-3.18 grams for carbohydrate per pound of body weight (g/lb)
High intensity, short duration (1 to 30 minutes continuous)	Track running (200 to 1,500 m), swimming (200-500m), cycling (short distance)	2.28-3.18 g/lb
High intensity, short duration (1 to 30 minutes with some rest periods)	Gymnastics, wrestling, boxing	2.28-3.64 g/lb
Moderate intensity, moderate duration (30 to 60 minutes)	Running 5-10k/cross country	2.73-3.64 g/lb
Intermittent high intensity, moderate to long duration (more than 1 hour)	Soccer, basketball, ice/field hockey, lacrosse, tennis	2.73-3.64 g/lb; 3.64-4.55 g/lb during heavy training and competition
Moderate intensity, long duration (1 to 4 hours)	Distance running, swimming, and cycling	3.64-4.55 g/lb during periods of heavy training and competition
Moderate intensity, ultra-long duration (more than 4 hours)	Ultra distance running, cycling	3.64-8.64 g/lb depending on the stage of training
Low intensity, long duration (more than 1 hour)	Golf, baseball, softball	2.28-3.18 g/lb
Other	Bodybuilding American football	2.28-4.55 g/lb depending on the stage of training 2.28-3.64 g/lb; varies according to position, more for backs and receivers, less for linemen

Source: Marie Dunford, J. A. D. (2008). Nutrition for Sport and Exercise. Belmont, CA, Wadsworth Cengage Learning.

in Table 2. Simple carbohydrates should make up no more than 50 percent of one’s daily carbohydrate intake. Added sugars found in candies, sodas, and processed food should not exceed 10 percent of your daily caloric intake. It is also best to spread your carbohydrate intake throughout the day.

References

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