

## EATING FOR GOALS

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Article Info	Abstract
<p><b>Received:</b>22/02/2025  <b>Revised:</b> 26/02/2025  <b>Accepted:</b>6/03/2025</p> <p><b>Keywords:</b> sports, nutrition, athletes.</p>	<p>Sports nutrition is a topic of constant change and has grown as a dynamic field of clinical study. Research continues to advise improved nutritional guidelines and support for both active adults and competitive athletes. Science recognises sports nutrition and energy intake as the “cornerstone of the athlete’s diet</p>

### INTRODUCTION

#### Origins and History of Sport Nutrition

Athletes have always been advised about what to eat, but the academic field now known as sport nutrition began in the exercise physiology laboratories. Historians consider the first studies of sport nutrition to be those of carbohydrate and fat metabolism conducted in Sweden in the late 1930s. In the late 1960s, Scandinavian scientists began to study muscle glycogen storage, use, and resynthesis associated with prolonged exercise. Technology was also developed to help those scientists measure human tissue responses to exercise. In 1965 something else was born in the laboratory. At the University of Florida a team of researchers led by Dr. Robert Cade developed a scientifically formulated beverage for the school’s football team. It bears his name and that of the school’s mascot—Gatorade.

In the 1970s exercise physiologists worldwide, but particularly in the United States, began to develop exercise physiology laboratories at universities and to study trained athletes. Distance runners and cyclists were

most frequently studied because these athletes were in danger of depleting their glycogen stores and these sports could be simulated easily in the laboratory with the use of treadmills and stationary bikes. Research facilities at military and astronaut training centres were also developed because these individuals need to be in top physical condition. Much of the initial published research focused on the use of carbohydrates.

Some research on protein was conducted, but studying protein was much more difficult than studying carbohydrate because protein is found in so many different places in the body. Bodybuilders were particularly interested in knowing more about how to obtain the maximum amount of protein and the highest rate of protein synthesis in skeletal muscles, but there was little research to answer their questions. Some scientists questioned whether bodybuilding was a sport; many considered it more of a sideshow compared to other athletic competitions. For these and other reasons,

bodybuilders began to learn about nutrition via personal experimentation and trial and error. Although there is more research on protein today, many of the fundamental questions about the amount and timing of protein intake remain because of the difficulty of studying these subjects. The optimal amount of protein intake for athletes continues to be a controversial subject.

As is the case with much laboratory research, knowledge leads to application. This resulted in more collaboration between exercise physiologists and nutritionists, particularly beginning in the 1980s. For example, exercise physiologists were discovering that endurance athletes, such as marathon runners and long-distance cyclists, benefited from consuming approximately 8 grams of carbohydrate per kilogram of body weight daily. But what food and beverages did athletes need to eat to obtain this much carbohydrate? Would such a high-carbohydrate diet meet the body's other nutritional needs to maintain good health? The expertise of nutritionists was needed for translating scientific information into practical applications.

The 1980s marked the emergence of the field known as sport nutrition. Considering its importance in supporting excellent athletic performance, sport nutrition as a specialized discipline developed relatively late. Initially, much of the focus was on endurance athletes, which paralleled the exercise physiology research that was being conducted. In fact, athletes were typically characterized as either endurance or strength athletes. Endurance athletes often focused primarily on carbohydrate intake; strength athletes focused primarily on protein intake.

During this time tremendous advances were being made in the training of athletes. By the 1990s resistance training was becoming a part of nearly all training and conditioning programs, including those for endurance athletes. Many predominantly strength athletes were beginning to incorporate more aerobic activities into their training. Strength athletes more carefully considered their carbohydrate intake, and endurance athletes were more

thoughtful about their protein intake. Athletes also began to train harder and for longer periods

than in the past. Nutrition was widely recognized as a way to support training and speed recovery. It became clear that the intensity and duration of training were major influences on athletes' nutritional needs.

### **What Is Sports Nutrition?**

Sports nutrition is the foundation of athletic success. It is a well-designed nutrition plan that allows active adults and athletes to perform at their best. It supplies the right food type, energy, nutrients, and fluids to keep the body well hydrated and functioning at peak levels. Sports nutrition is unique to each person and is planned according to individual goals

### **Sports Nutrition Basics: Macronutrients**

The energy required for living and physical activity comes from the food we eat and fluid intake.

Macronutrients in the following food groups supply the energy essential to optimal body function:

**Carbohydrates** are either simple or complex, and the most important energy source for the human body. Simple carbs include sugars naturally occurring in foods like fruits, vegetables, and milk. Whole grain bread, potatoes, most vegetables, and oats are examples of healthy complex carbs.

**Proteins** are made up of a chain of amino acids and are essential to every cell of the human body. Protein can either be complete or incomplete. Complete protein contains all the amino acids needed by the body, and include animal sources like meat, fish, poultry and milk. Incomplete protein sources (typically plant-based proteins) often lack one or more of the essential amino acids. Essential amino acids can't be made by the body and must be supplied

by food. Protein plays an important role in muscle recovery and growth.

**Fats** can be saturated or unsaturated, and they play a vital role in the human body. Unsaturated fats are considered healthy and come from plant sources like olive oil and nuts. Saturated fats are found in animal products like red meats and high-fat dairy, which are indicated to increase the risk of disease. Healthy fats provide energy, help with body development, protect our organs, and maintain cell membranes.

### **The Goal of Sports Nutrition**

Active adults and competitive athletes turn to sports nutrition to help them achieve their goals. Examples of individual goals could include gaining lean mass, improving body composition, or enhancing athletic performance. These sport-specific scenarios require differing nutritional programs. Research findings indicate the right food type, caloric intake, nutrient timing, fluids, and supplementation are essential and specific to each individual. The following are different states of training and competitive sport benefiting from sports nutrition:

### **Eating for Exercise/Athletic Performance**

Training programs require a well-designed diet for active adults and competitive athletes. Research shows a balanced nutrition plan should include sufficient calories and healthy macronutrients to optimize athletic performance. The body will use carbohydrates or fats as the main energy source, depending on exercise intensity and duration. Inadequate caloric intake can impede athletic training and performance.

Active adults exercising three to four times weekly can usually meet nutritional needs through a normal healthy diet. Moderate to elite athletes performing intense training five to six times weekly will require significantly more nutrients to support energy demands. For example, and according to research, energy expenditure for extreme cyclists competing in the *Tour de France* is approximately 12,000 calories per day.

**Carbohydrates** are the main fuel source for an active adult or competitive athlete. General guidelines for carbohydrate

intake are based on body size and training characteristics. Carbohydrate needs in a daily diet can range from 45 to 65 percent of total food intake depending on physical demands.

**Proteins** are responsible for muscle growth and recovery in the active adult or athlete. Sufficient amounts of protein per individual help maintain a positive nitrogen balance in the body, which is vital to muscle tissue. Protein requirements can vary significantly ranging from .8g to 2g per kilogram of body weight per day.

**Fats** help maintain energy balance, regulate hormones, and restore muscle tissue. Omega-3 and omega-6 are essential fatty acids that are especially important to a sports nutrition diet. Research findings recommend an athlete consume approximately 30 percent of their total daily caloric intake as healthy fat.

### **Eating for Endurance**

Endurance programs are defined as one to three hours per day of moderate to high-intensity exercise. High-energy intake in the form of carbohydrates is essential. According to research, target carbohydrate consumption for endurance athletes ranges from 6g to 10g per kilogram of body weight per day. Fat is a secondary source of energy used during long duration training sessions. Endurance athletes are more at risk for dehydration. Replacing fluids and electrolytes lost through sweat are necessary for peak performance.

### **Eating for Strength**

Resistance training programs are designed to gradually build the strength of skeletal muscle. Strength training is high-intensity work. It requires sufficient amounts of all macronutrients for muscle development. Protein intake is especially vital to increase and maintain lean body mass. Research indicates protein requirements can vary from 1.2g to 3.1g per kilogram of body weight per day.

### **Eating for Competition**

Preparing for a competitive sport will vary in sports nutrition requirements. For example, strength athletes strive to increase lean mass and body size for their sport. Endurance runners focus on reduced body weight/fat for peak body function during their event. Athletic goals will determine the best sports nutrition

strategy. Pre and post-workout meal planning are unique for each athlete and essential for optimal performance.

### **Hydration and Sports Performance**

Adequate hydration and electrolytes are essential for health and athletic performance. We all lose water throughout the day, but active adults and athletes lose additional body water (and a significant amount of sodium) sweating during intense workouts.

Dehydration is the process of losing body water, and fluid deficits greater than 2 percent of body weight can compromise athletic performance and cognitive function. Athletes are recommended to use fluid replacement strategies as part of their sports nutrition to maintain optimal body functioning. Rehydration with water and sports drinks containing sodium are often consumed depending on the athlete and sporting event. Lack of sufficient hydration for athletes may lead to the following:

- Hypohydration (dehydration)
- Hypovolemia (decreased plasma/blood volume)
- Hyponatremia (low blood sodium levels/water intoxication)

### **Supplements in Sports Nutrition**

Sports supplements and foods are unregulated products marketed to enhance athletic performance. According to the *Academy of Sports Medicine*, “the ethical use of sports supplements is a personal choice and remains controversial.” There are limited supplements backed by clinical research. The *Australian Institute of Sport* has provided a general guide ranking sports performance supplements and foods according to significance of scientific evidence:

- **Sports food:** sports drinks, bars, and gels, electrolyte supplements, protein supplements, liquid meal supplements
- **Medical supplements:** iron, calcium, vitamin D, multi-vitamin/mineral, omega-3 fatty acids
- **Performance supplements:** creatine, caffeine, sodium bicarbonate, beta-alanine, nitrate

### **Sports Nutrition for Special Populations and Environments**

Sports nutrition covers a wide spectrum of needs for athletes. Certain populations and environments require additional guidelines and information to enhance athletic performance.

**Vegetarian athlete:** A vegetarian diet contains high intakes of plant proteins, fruits, vegetables, whole grains, and nuts. It can be nutritionally adequate, but insufficient evidence exists on long-term vegetarianism and athletic performance. Dietary assessments are recommended to avoid deficiencies and to ensure adequate nutrients to support athletic demands.

**High altitude:** Specialized training and nutrition are required for athletes training at high altitude. Increasing red blood cells to carry more oxygen is essential. Iron-rich foods are an important component for this athlete as well. Increased risk of illness is indicated with chronic high altitude exposure. Foods high in antioxidants and protein are essential. Fluid requirements will vary per athlete, and hydration status should be individually monitored.

**Hot environments:** Athletes competing in hot conditions are at greater risk of heat illness. Heat illness can have adverse health complications. Fluid and electrolyte balance is crucial for these athletes. Hydration strategies are required to maintain peak performance while exercising in the heat.

**Cold environments:** Primary concerns for athletes exercising in the cold are adequate hydration and body temperature. Leaner athletes are at higher risk of hypothermia. Modifying caloric and carbohydrate intake are important for this athlete. Appropriate foods and fluids that withstand cold temperatures will promote optimal athletic performance.

### **Special Topics in Sports Nutrition**

**Eating disorders** in athletes are not uncommon. Many athletes are required to maintain lean bodies and low body weight, and exhibit muscular development. Chronic competitive pressure can create psychological and physical stress of the athlete leading to disordered eating habits.

Without proper counseling, adverse health effects may eventually develop. The most common eating disorders among athletes may include:

Anorexia nervosa, Bulimia

Compulsive exercise disorder, Orthorexia

Obviously, the nutritional needs of these individuals greatly differ from those of other active adults or athletes. Until someone with an eating disorder is considered well again, the primary focus should be put on treating and managing the eating disorder and consuming the nutrition needed to achieve and maintain good health, rather than athletic performance.

**Micronutrient deficiencies** are a concern for active adults and athletes. Exercise stresses important body functions where micronutrients are required. Additionally, athletes often restrict calories and certain food groups, which may potentially lead to deficiencies of essential micronutrients. Research indicates the most common micronutrient deficiencies include:

Iron deficiency: can impair muscle function and compromise athletic performance

Vitamin D deficiency: can result in decreased bone strength and reduced muscle metabolic function

Calcium deficiency can impair the repair of bone tissue, decrease the regulation of muscle contraction, and reduce nerve conduction

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#### Roles of a Sports Dietitian

Athletes and active adults are seeking guidance from sports professionals to enhance their athletic performance. Sports dietitians are increasingly hired to develop nutrition and fluid programs catered to the individual athlete or teams. A unique credential has been created for sports nutrition professionals: *Board Certified Specialist in Sports Dietetics* (CSSD). Sports dietitians should have knowledge in the following areas:

- Clinical nutrition
- Nutrition science
- Exercise physiology
- Evidence-based research
- Safe and effective nutrition assessments
- Sports nutrition guidance
- Counselling for health and athletic performance
- Medical nutrition therapy
- Design and management of effective nutrition strategies
- Effective nutrition programming for health, fitness, and optimal physical performance

Looking for a sports nutritionist in your area? The *International Society of Sports Nutrition* offers a reputable online search directory to assist you.

#### A Word from Verywell

You may be an active adult exercising for health improvement or a competitive athlete. Whatever the case, sports nutrition will play an important role in your success. Eating for goals is what sports nutrition is all about. It can help enhance athletic performance, improve exercise recovery, and make reaching your goals possible.

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