

# Role of Nutritions in Performance of a Sportsman

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## ABSTRACT

A number of factors contribute to success in sport, and diet is a key component. An athlete's dietary requirements depend on several aspects, including the sport, the athlete's goals, the environment, and practical issues. The importance of individualized dietary advice has been increasingly recognized, including day-to-day dietary advice and specific advice before, during, and after training and/or competition. Athletes use a range of dietary strategies to improve performance, with maximizing glycogen stores a key strategy for many. Carbohydrate intake during exercise maintains high levels of carbohydrate oxidation, prevents hypoglycemia, and has a positive effect on the central nervous system. Recent research has focused on athletes training with low carbohydrate availability to enhance metabolic adaptations, but whether this leads to an improvement in performance is unclear. The benefits of protein intake throughout the day following exercise are now well recognized. Athletes should aim to maintain adequate levels of hydration, and they should minimize fluid losses during exercise to no more than 2% of their body weight. Supplement use is widespread in athletes, with recent interest in the beneficial effects of nitrate, beta-alanine, and vitamin D on performance. However, an unregulated supplement industry and inadvertent contamination of supplements with banned substances increases the risk of a positive doping result. Although the availability of nutrition information for athletes varies, athletes will benefit from the advice of a registered dietician or nutritionist.

**Keywords:** nutrition, diet, sport, athlete, supplements, hydration.

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## INTRODUCTION

Nutrition, physical performance and the level of functional capacity of the human beings are interrelated. Any dietary deficiency that adversely affects the health of the individual is likely to impair his or her physical performance capacity and thus nutrition and well being assumes a vital role in the field of sports. The consequence of extremely prolonged exercise is huge energy expenditure and the subsequent nutrient loss and therefore athletes must be continuously supplied with adequate nutrients, to maintain their optimum nutritional

well being. During the past 20 years there have been greater developments in the scientific understanding of the role of nutrition in health and physical performance. Sports performance is becoming increasingly competitive. More and more stress is being placed on how well you perform. To reach your highest potential, all of your body system must be perfectly fit and establish optimum nerve muscle reflexes. Without the right foods, even the physical conditioning and expert coaching aren't enough to push to your best. Sports nutrition has many goals to enhance performance. First, it improves performance by improving body composition, which increases speed, quickness, mobility, and strength. Second, it will help the speed of recovery, which will in turn create more capacity for practicing and competition as the body is becoming more fit and adjusted to the coupling of the good nutrition incorporated into the workout regimen. Third, it will allow one to increase energy for both practice and competition, which will definitely help one's performance. A strategic diet will also increase immunity, allowing one to stay healthy and be able to continue and intensify practice and training.

Thus nutritional status is a critical determinant of athletic performance. Without the right kind and proportion of foods to balance body's nutrient needs, even the physical conditioning and expert coaching do not suffice to bring out the best. Macro and micronutrients play an important role in energy production, haemoglobin synthesis, and maintenance of bone health, adequate immune function and protection of body against oxidative damage. They assist with the synthesis and repair of muscle tissue during recovery from exercise and injury. Meeting energy needs is a nutrition priority for athletes. Nutrition intake is undoubtedly an important component that has an impact on physical performance of athletes both men & women. Many sports scientists agree on the fact that sports, health and invariably the nutritional status are inter related. Reports both from western countries and India have strongly supported this view that at the very basic level, good nutrition plays an important role in the maintenance of health allowing the athlete to train and compete. In countries such as India where malnutrition is of a public health dimension, poor athletic performance could be partly due to poor physique and unsatisfactory physical fitness resulting from under nourishment. Nutritional status refers to the health of an individual and has a direct bearing on their physical performance and work capacity.

Nutrition is increasingly recognized as a key component of optimal sporting performance, with both the science and practice of sports nutrition developing rapidly. Recent studies have found that a planned scientific nutritional strategy (consisting of fluid, carbohydrate, sodium, and caffeine) compared with a self-chosen nutritional strategy helped nonelite runners complete a marathon run faster and trained cyclists complete a time trial faster. Whereas training has the greatest potential to increase performance, it has been estimated that consumption of a carbohydrate-electrolyte drink or relatively low doses of caffeine may improve a 40 km cycling time trial performance by 32–42 and 55–84 seconds, respectively. Evidence supports a range of dietary strategies in enhancing sports performance. It is likely that combining several strategies will be of greater benefit than one strategy in isolation. Dietary strategies to enhance performance include optimizing intakes of macronutrients, micronutrients, and fluids, including their composition and spacing throughout the day. The importance of individualized or personalized dietary advice is becoming increasingly recognized, with dietary strategies varying according to the individual athlete's sport, personal goals, and practicalities (eg, food preferences). "Athlete"

includes individuals competing in a range of sport types, such as strength and power (eg, weight-lifting), team (eg, football), and endurance (eg, marathon running). The use of dietary supplements can enhance performance, provided these are used appropriately



### **WHY SPORTS NUTRITION IS IMPORTANT?**

Participating in endurance sports requires optimal nutrition, with specific focus on dietary modifications. Targeted fitness development at an early age, especially in adolescence is deemed the foundation for leading an active lifestyle, avoiding potential overweight, reducing motor deficiencies and thus improving the general quality of life . At the time of final performance an athlete is supposed to be well nourished, uninjured, fit, focused and ready to compete. Sports nutrition is not just about calories to achieve weight or body composition goals; nor is it all about protein for muscles or carbohydrates for fuel. Nutritional and eating habits have been of specific interest in sports, especially given their impression on athletic performance. General recommendations need to be suggested by sports nutrition experts to accommodate the specific requirements of individual athlete regarding health, sports, nutrient, food choices and body weight and body composition. Athlete challenges their bodies on a regular basis through tough physical training and competitions. In order to keep up with demand for stamina of their activity or sport, athlete needs adequate fuel for their body on day to day basis. Nutrition is important for an athlete because it provides energy required to perform the activity. The food they take leaves an impact on strength, training, performance and recovery. Not only the type of food is important for sport nutrition but also the time is equally important for what they eat throughout the day. It also has an impact on their performance level and their body ability to recover after workout. An athlete needs to pay close attention about when, what and how much does he eat or drink prior to a game or match [8]. The role of nutrition in sports performance is very important. Proper nutrition must be available prior, during and post competition. Greany and Jeukendrup stated that from fueling to recovery, muscle building weight and making optimal nutrition ensure the best platform for success in any sport . Meals eaten after and before the exercise are the most important in nutrition but we should really be very careful with all that the athlete intake in his body. As a general rule of thumb an

athlete should eat about two hours before any exercise and the meal should be high in carbohydrates, low in fat and low to moderate in protein. Carbohydrates are the main source of energy that provides power to an athlete in exercise regime. Protein is required to develop muscle growth.

### **ROLE OF CARBOHYDRATES**

Carbohydrates are the most important source of energy. It is the most preferred fuel for sports performance. Glucose is the simplest form of carbohydrate and starch is example of complex carbohydrates. Different forms of carbohydrates which we consume in the diet are converted into glucose in our body which is then metabolized to produce energy. 1 gm of carbohydrate gives 4 Kilo calories of energy. Excess glucose is converted to glycogen in the liver & muscles. Glucose gives instant energy whereas glycogen gives sustained energy. Normal blood glucose levels are 90 to 120 mg/100 ml. Above this level leads to hyperglycemia (high blood sugar) and less than 80 mg leads to hypoglycemia (low blood sugar) Athletes need plenty of complex carbohydrates (starchy foods) along with proper training, as these foods helps muscle and liver cells to store glycogen. Glycogen is a vital energy source for most sports. When muscle cells run out of glycogen, muscle fatigue and tiredness sets in and performance suffers. Right kind of diet with right emphasis on starchy foods will result in enough stored glycogen to carry you through 90 minutes of vigorous activity. Foods rich in carbohydrates are Cereals like rice, wheat & wheat products. (broken wheat rava, pasta etc. ) and millets like maize, bajra, jowar, oats, ragi, and roots & tubers like potatoes, sweet potatoes, carrots etc. Carbohydrates contribute 50 to 60% of total energy requirement in a day.

### **ROLE OF PROTEINS**

Primary role of proteins is body building and growth. Every organ, tissue and cells in our body is made up of proteins. Proteins help in muscle development and maintenance and repair of all tissues. Protein requirement for normal people is 1 gm per kg ideal body wt but for athletes it can be increased to 1.2 to 1.5 grams per kg body wt in a day. About 60 to 80 grams of protein is sufficient for a day which can be obtained from milk egg, meat, fish, dhal, pulses, cereals etc but excess consumption of protein foods is not advisable as it can increase the work load on kidneys and can cause kidney damage in the later stage. It is a misconception that excess consumption of meat, milk, eggs etc will give energy & stamina.

### **ROLE OF FATS**

Fats are concentrated source of energy. 1gm of fat will give 9 kilo calories which is double the amount produced by carbohydrates. For example 2 teaspoon of butter and 1 cup of rice gives 100 kilo calories. 20 to 30% of the total energy required in a day should come from fats. It is not good to consume excess amount of fat in the diet as it will lead to obesity and heart diseases in the later part of life. It is better to avoid lot of butter and ghee and take more of vegetable oils like sunflower oil, soya bean oil or rice bran oil.

## ROLE OF VITAMINS AND MINERALS

Vitamins and minerals are known as the micronutrients as they are found in less amounts in the body, but they play a major role in maintaining many important physiological functions. Foods rich in vitamins and minerals are also known as “protective foods” as it helps to build body’s resistance and immunity and helps in energy metabolism, strengthening of bones and muscles, good vision, blood formation etc. Fat soluble vitamins are Vitamin A, D, E and K and rich sources are green leafy vegetables, orange yellow fruits and vegetables like carrot, mango, papaya etc. Water soluble vitamins are B complex and Vitamin C which are needed for various coenzymic activity with the metabolism of fat and carbohydrate and proteins. It also helps in functioning of nervous system and regulates various body processes. Important food sources are citrus fruits, milk, eggs, nuts, cereals etc. Vitamin deficiency of all kinds are damaging to work performance and can impair physical work capacity which is expected to have the most immediate effect. Major minerals are calcium and phosphorus which is needed for the bones and teeth and for muscle functioning. Iron deficiency is associated with decreased work capacity, poor mental performance and reduced haemoglobin levels which will lead to decreased oxygen carrying capacity and cause anemia. Low calcium levels can cause irregular muscle contractions, bone density loss etc. Foods like milk, egg, liver, meat, ragi, oats, green leafy vegetables, dry fruits like dates etc should be included in the diet. Other important minerals are sodium, potassium, zinc, magnesium, fluoride, iodine, copper etc which perform specific functions in the body.



## ROLE OF WATER

Of all the nutrients water is probably the most essential for human life. Water constitutes 60-65% of the total body weight, 70% of the muscle composition, and 90% of the blood plasma. When you exercise your body loses water through perspiration which can lead to dehydration. Excess loss of water can lead to serious problems for sports people. It causes cramps, vomiting, delirium and lead to unconsciousness similar to sunstroke. Guide lines to maintain water and electrolyte balance are as follows. Athletes are advised to drink plenty of water, fluids at

least 8-10 glasses of water in a day. About 2hrs before the event consume 500 ml of water and 10-15 mts before the event drink another 500ml of water During the competition it is better to drink small amounts 100-200 ml of chilled water every 10-15 mts rather than a large amount at a time After the event also the athlete should be consuming plenty of water and fluids for next 24-36 hrs to restore water balance Also electral solution can be taken in between to restore electrolyte balance.

### CONCLUSIONS

It is very important for an athlete to get a meal that is high in carbohydrate as carbohydrates are the instant source of energy. The meal before the game should thus contain ample amount of carbohydrate as they provide glucose to the bloodstream quickly and thus charge the athletes with an instant source of energy. White bread, vegetables, and cereal without excess fiber can be included in the pregame diet. Many nutrition specialists are of the opinion that fruits should be included in the pregame diet as they contain natural sugar which is digested easily and proves to be a good source of instant energy. However, it should always be kept in mind that the fruits included in the pregame diet should be light. Include lots of fluid in your diet as they hydrate your body cells and also get digested easily. They also comparatively provide energy quicker than their solid counterparts. So include glucose drinks and juices in the pregame diet. However, consume it moderately as it can also lead to frequent urination. Make sure whatever is eaten as the pregame diet, is eaten it on the right time. Dieticians say that for an afternoon or evening game, the athlete should be given a full meal about 3-4 hours before the game so that the athlete doesn't feel hungry during the game. However if due to any reason the meal has to happen closer to the game, try to include easily digestible small quantity of food.

Athletes are always looking for an edge to improve their performance, and there are a range of dietary strategies available. Nonetheless, dietary recommendations should be individualized for each athlete and their sport and provided by an appropriately qualified professional to ensure optimal performance. Dietary supplements should be used with caution and as part of an overall nutrition and performance plan. Finally the future of nutritional supplement looks bright in regard to the areas of transport mechanism, improved muscle retention as well as treatment of numerous clinical maladies through supplementations.

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