

# Role of Nutrition and Balanced Diet in Enhancing Sports Performance

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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.

## **ROLE OF VARIOUS NUTRIENTS IN SPORTS NUTRITION**

Good nutrition must be a key part of training programmes if one has to succeed. The nutrients are the distinct chemical components in the food. The six major nutrients present in the food are mainly **carbohydrates, protein, fats or lipids, vitamins, minerals and water**. They are like team mates that work together to provide good nutrition. Just as each team member carries out different tasks during a game each nutrient performs specific functions in your body. A lack of even one nutrient is a disadvantage to your body. Nutritional deficiencies can result in decreased performance.

### **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 help 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.

### **Carbohydrate loading:**

The ability to sustain peak performance over an extended period of time (as in a marathon race) is influenced by the availability of muscle glycogen which is the stored form of carbohydrate. To build up glycogen stores, two phases of preparation are recommended. First about a week before the competition, the athlete exercises vigorously to deplete glycogen stores and consumes diet high in protein and fat and restricted to about 100g carbohydrate. Second after 2 to 3 days of the glycogen depleting phase, a diet low in fat, moderate in protein and high in carbohydrate (200-500g) is consumed for 3-4 days. Complex carbohydrates like cereals, millets that also furnish minerals and vitamins are preferred to simple sugars.

Carbohydrate loading is not recommended for short term competition since it can lead to a feeling of heaviness that is a disadvantage in high intensity competition. It is also not advised for athletes in early adolescence and should be used no more than two or three times a year.

## **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.

## **ENERGY REQUIREMENTS**

Carbohydrates, fats and proteins are known as energy yielding nutrients. But carbohydrates are the major source of energy, then fats and least from proteins. Approximately the caloric need of an athlete is around 3000 k calories per day. During heavy training and competition the requirement may go up to 5000Kcals per day.

An athlete whose energy requirement is 5000 kilo calories per day, the energy distribution from various nutrients should be as follows:

Nutrients	%	Kilo calories	Grams
Carbohydrates	55 to 60	2750 to 3000	650 to 750
Fat	25 to 30	1250 to 1500	130 to 160
Proteins	8 to 10%	300 to 500	100 to 125

Carbohydrate is the preferred fuel of preference and the critical food stuff for the active person. This carbohydrate should be in a complex form which will not only meet increased energy needs but also supply added vitamins and minerals.

### **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 Vi t 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 problem 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.

### **RECOMMENDED DIETARY ALLOWANCE (RDA)**

An adequate balanced diet is necessary for an effective performance. The nutritional requirements of the athlete are more than the normal persons. But excess consumption of any nutrient more than the recommended dietary allowance (RDA) will be harmful and dangerous. Following is the RDA for sports persons

<b>NUTRIENTS</b>	<b>DAILY REQUIREMENTS</b>
<b>Energy</b>	<b>3000--- 5000 KCals</b>
<b>Protein</b>	<b>60---90gms</b>
<b>Fat</b>	<b>80----150gms</b>
<b>Calcium</b>	<b>600-800mg</b>
<b>Iron</b>	<b>20—30mg</b>
<b>Vitamin A</b>	<b>750-1000mcg</b>
<b>Thiamine(B1)</b>	<b>2-3mg</b>
<b>Riboflavin (B2)</b>	<b>2—3.2mg</b>
<b>Niacin (B3)</b>	<b>26—36mg</b>
<b>Ascorbic acid ( Vit C)</b>	<b>50-80mg</b>

### **DIETARY GUIDELINES FOR SPORTS PERSONS**

Follow a balanced diet and eat all types of food in moderation

- Never skip breakfast as it the most important meal of the day
- It is better to eat 3- 5 meals a day rather than eating three heavy meals
- Have milk at least 2-3 glasses per day.
- Have plenty of fruits like papaya , guava , citrus fruits, watermelon etc and fruit juices.
- Have sprouted pulses (chana or moong) and salads at least a bowl every day.
- Eat whole cereals like daliya (broken wheat upma) wheat and ragi porridge & Oats.
- Eat dry fruits like dates raisins and nuts like groundnuts almonds etc
- Restrict nonvegetarian foods 2-3 times a week and reduce excess consumption of red meat.
- Have only 1-2 eggs per day.
- Have plenty of green leafy vegetables, carrots, beetroot and other vegetables.
- Drink plenty of water.
- Avoid soft drinks, alcohol and too much of coffee, tea, fatty foods and other junk foods and too many sweets.
- Never exercise immediately after a meal, or else it can lead to nausea, vomiting, distension and cramping.

## **Pregame Meal Guidelines**

It is mandatory for an athlete to eat right and stay fit. Specially before participating in some game, it is extremely important for them to check

upon what they consume. As what they eat affects how they feel and ultimately affects their performance. Though there is not a fixed diet chart to be recommended as a pregame meal plan because every game and every individual has their own requirements but there are obviously certain things that should be kept in mind while planning a pregame meal.

### **Include rich carbohydrate diet**

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.

### **Include fruits in the 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 moderate amount of proteins in diet**

Protein is an important part of an athlete's diet, so always remember to include rich protein contents in the diet. However, generally the food rich in protein is also high in fat content. Excess of this diet may cause

sluggishness and nausea to the athlete, so remember to serve them in small servings. Chicken breast or a small piece of sirloin steak will be the best protein supplement.

### **Include fluids in your diet**

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.

### **Strictly avoid Caffeine, Sweets and fat containing products**

Few things that you must avoid in the pregame diet are caffeine, sweets and fatty products. Avoid caffeine because it causes excess urine production that can lead to dehydration. Sweets, on the other hand should be avoided because they lower the blood sugar level leaving you exhausted and lethargic. Also avoid deep fried foods, gravies, dry fruits and dairy products because they can take a toll on the energy and activeness of the athlete.

### **Don't experiment with the meal**

Make sure whatever is provided to the athlete as a pregame meal is already consumed by him on prior occasions. In order to avoid any last moment mishap like dysentery or food allergy, remember not to experiment with food. Also, go according to the taste of the athlete, so that he eats properly.

### **Consume it on the right time**

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.

Thus a well balanced diet and effective training and coaching will be the winning combination and will help the athlete to build up strength and stamina. Hence systematized modification of diet with steady monitoring of the deficiencies if any, by a sports dietician, linked with skilled training programme and effective nutrition education can definitely lead to better performance. This is the only answer for today's ailing Indian sports and for sure our sports men and women can bring laurels to our country.

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