JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

ROLE OF NUTRITION FOR ATHLETES IN SPORTS

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Abstract: Nutrition play major role in sports. It can help enhance athletic performance, improve exercise, recovery and make reaching your goals possible. Sports nutrition is a highly regarded field of modern sports medicine, which helps players to keep their good body condition so as to achieve the optimal performance. The certain type of nutrition and dietary combinations enhance sports performance. Mainly six basic substances are required in the food: Carbohydrates, Proteins, Fats, Vitamins, Minerals and water. Each of these has specific function in providing nourishment to the body. The player's diet should be high in carbohydrate, moderate in proteins and low in fats.

Athletes are some of the most physically fit people in the world. They train for hours every day, and they push their bodies to the limit, in order to be best in their sport. But even with all their hard work, they can't reach peak performance without proper nutrition.

A healthy diet is essential for athletes. It provides them the energy they need to train and compete, and it helps to protect them from injuries. It also helps to improve athletes' recovery time, which allow them to train more often and improve their performance.

Keywords: Nutrition, Athletes, Sports, Performance, Exercise.

INTRODUCTION

SPORTS NUTRITION:

Sports nutrition is a specialization within the field of nutrition that partners closely with the study of the human body and exercise science.

Sports Nutrition can be defined as the application of nutrition knowledge to a practical daily eating plan providing the fuel for physical work and achieve athletic performance in competitive events, while also promoting overall health and wellness.

Sports Nutrition is the foundation for any type of player. It is well designed nutrition plan that allows active adults and athletes to perform at their best. Sports nutrition and energy intake has been established as the cornerstone of the athlete's diet. Nutrition in field of sports is a topic of constant change and has grown as dynamic field of the clinical study. Different nutrients have been explored for their potential to optimize

athletic performance, especially when engaged in high intensity sports which involves repetitive activity. Athletes regularly engaging in strenuous exercise program should aware of their daily nutritional needs. Maintaining a healthy diet that provides adequate energy and nutrients is vital to support intense training as well as to optimize immune system functions.

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.

Good nutrition can enhance sporting performance. A well planned, nutritious diet should meet most of an athlete's vitamin and mineral needs, and provide enough protein to promote muscle growth and repair. Foods rich in unrefined carbohydrates, like wholegrain breads and cereals, should form the basis of the diet.

Important factor of sports nutrition:

Carbohydrate are the main source of energy that powers player's exercise regime and protein is required to aid muscle growth and repair. After exercising player's need to replace the carbohydrates that they lost and need to ensure proper muscle recovery by including protein in post training meal.

Three principles of sports nutrition:

Fuelling: Providing the body with food to enhance stamina, strength and clarity.

Hydration: Preventing dehydration and fatigue, whilst optimizing muscle performance.

Recovery: To aid in recovery after exercise,

Three main goals of proper sports nutrition:

1. Provide the necessary energy for exercise,
2. Regulate body metabolism,
3. Provide nutrients to maintain and repair tissues.

FUEL FOR SPORT:

Carbohydrate and fat are the key sources of energy for exercising muscles. Carbohydrates are the main energy source for all exercise but in particular fuel the body for high intensity work such as sprinting and multi sprints. Fat is primarily the fuel burned for low-moderate intensity exercise such as such as long steady state running or swimming.

Carbohydrate is the body's fuel for high intensity work such as sprinting and multiple sprints.

The proportions of these fuels used during exercise depend on the exercise intensity, duration of the event, and the training and nutritional status of the individual.

Nutrient requirement

To support high intensity training or competition, athlete need to focus on consuming a variety of nutrient-dense foods from the five basic food groups:

1. Fruits
2. Vegetables
3. Grains
4. Lean Proteins
5. Low fat dairy alternatives

The main things to focus on when building a high performance eating plan:

- Include wide variety of fruits and vegetables that provide important vitamins, minerals, and phytonutrients.
- Prioritize whole grains over refined grains, making at least half the whole grains eat.
- Include variety of lean proteins such as chicken, pork, fish, turkey, eggs, soy products and meat alternatives.
- Increased intake of low fat dairy or dairy alternatives.
- Use oils such as olive oil instead of butter and margarine to boost your intake of healthy fats.
- Regularly include wild-caught fatty fish such as salmon in your diet to ensure good omega-3 intake, in plant-based omega-3s such as Chia seeds and walnuts.
- Focus on foods that are high in potassium, fiber, calcium, and vitamin D, as these nutrients tend to be lacking in traditional diets.

  These basic eating principles, helps athlete in building a high performance diet and supporting athletes training through nutrition.

Macronutrients – The Basic of Sports Nutrition:

Energy requirements

In order for athletes to meet their energy needs, they must consume sufficient calories. If energy needs are not met, fat and lean body tissue will be used as fuel by the body. This will cause a loss of strength and endurance. Furthermore, immune endocrine, and musculoskeletal function will be compromised. Over time, low calories intake may result in a slower resting metabolic rate, and inadequate consumption of essential vitamins and minerals.

Athletes who participate in weight class sports such as boxing, kickboxing and mixed martial arts are at risk for the adverse effects of poor energy intake if they undergo extreme measures to rapidly lose weight prior to competition. Such energy restrictions may cause loss of muscle and may interfere with athletic performance.

Group	Average body weight (kg)	Type of activity	Energy requirement kcal/kg body wt.	Total energy requirement kcal
I	80-90	Power events of higher weight lifters judo; power lifting, kabadi and wrestling.	70	6000
II	65(60-70)	Endurance events marathon, long distance running, walking, cycling, long distance swimming (>200 m) rowing, canoeing.	80	5200
III a	65	Team events like basketball,	70	4500

		football, hockey, volleyball and power events of middle weight category (60-80 kg)		
III b	60	Events of light weight category gymnastics, table tennis, yachting, power events of light weight category (60 kg and below)	60	3600
IV	60	Skilled events like shooting archery horse-riding.	50	3000

Source: Nutrient requirements and recommended dietary allowances for Indians; 2010, ICMR.

Carbohydrate requirements:

Carbohydrates are divided into two main groups- sugars (simple carbohydrate) and starches (complex carbohydrate). It is important to include generous amounts of a variety of carbohydrate containing foods at all meals and snacks. The athletes' diet should contain 60-70% of total calories as carbohydrate during the training season, mostly in the form of starchy foods, including those in high fiber. Sugary foods may be useful in maintaining a sufficiently high carbohydrate intake for athletes with high energy requirements.

Starchy foods:

Eat larger amounts of these.

- Breakfast cereals/porridge
- Bread all types
- Potatoes, pasta, rice, noodles.
- Crackers, crispbread, rice cakes, oatcakes, pitta bread
- Pulses- peas, lentils, beans (bakes, kidney, butter)
- Fruits- fresh, dried, tinned juices
- Root vegetables (Parsnip, beetroot, carrots, sweet potates)
- Thick crusty pizza bases (low fat topping)
- Low fat yoghurt and milk based drinks
- Plain popcorn
- Cereals bars, not sugar coated.

Sugary foods:

Eat smaller amounts of these.

- Sugar
- Jam, marmalade, honey, fruit spread
- Boiled sweets, jellies, glucose sweets
- Sweetened drinks, minerals

- Dessert- fruit crumbles, jellies
- Cakes- fruit cake, fruit scones, fruit muffins

Carbohydrate includes both complex and simple sugars. Carbohydrates maintain blood sugar levels to fuel exercise. They also replenish glycogen which is the storage form of carbohydrates within muscles. The recommended daily carbohydrate intake for athletes ranges from 6-10 g/kg body weight.

Protein requirements

Protein is the building block of muscle tissue. In addition, it has many other functions throughout the human body. Endocrine athletes are advised to ingest between 1.2-1.4 grams of protein per kilogram of body weight each day. Ultra endurance athletes who participate in continuous training for several hours or consecutive days should consume slightly more protein than this; however consumption of more than 2 grams of protein per kg of body weight is not recommended. Strength athletes are encouraged to consume protein in the range of 1.2-1.7 g/kg body weight. This amount is generally easy to obtain through a normal diet without the use of supplements. High quality protein sources such as whey, casein, or soy are equally effective in the maintenance, repair and synthesis of muscle proteins.

Fat Requirements

Adequate intake of fat is necessary for numerous metabolic activities that promote optimal health. For example, vitamins A, D, and E require fat for proper absorption. Fat intake for an athlete should range between 20-35% of total daily calories.

Micronutrients: The deficiency of micronutrients is of great concern to players. Exercise stresses important body functions where micronutrients are required. Moreover, some athletes restrict calories and certain foods which lead to deficiency of micronutrients. Most common deficiency is Iron deficiency, which can impair muscle function and respiration because of hemoglobin deficiency.

Vitamin and Mineral requirements

Micronutrients function in a variety of roles that optimize health. They are involved in energy production, blood synthesis, maintenance of Bone health, immune function, and the prevention of oxidative damage. They also aid in the process of muscle and tissue repair during recovery from exercise or injury.

Generally, athletes consuming a healthy diet do not require any additional supplementation of micronutrients. However, a multivitamin supplement may be appropriate if an athlete is dieting, or avoids certain food or food groups. Supplementation of single nutrients such as iron may be required if a deficiency is diagnosed by a medical professional.

While supplementation with high doses of antioxidants (Vitamins C, E and B-carotene) is becoming a popular practice among athletes, there is little evidence to suggest that antioxidant supplements enhance performance. Athletes should be cautious of mega-dosing with these vitamins since higher doses are likely to promote a deleterious effect.

Vegetarian athletes may be at risk for low intakes of iron, calcium, vitamin D, riboflavin, zinc and vitamin B12.

Water

The human body can survive for a long duration without any of the micro and macro nutrient but not without water. The body is made up of 55-60% water, representing a nearly ubiquitous presence in bodily tissues and fluids. In athletics, water is important for temperature regulation, lubrication of joints and the transport of the

nutrients to active tissues. It regulates the body's temperature, cushions and protects vital organs, aids the digestive system, acts within each cell to transport nutrients and dispel waste.

RECOVERY FROM EXERCISE

Depletion of carbohydrate (glycogen) stores is one of the main factors which lead to muscle fatigue. It is necessary to replenish glycogen stores immediately after exercise to ensure adequate energy stores for players next training session or event. This will be achieved by eating foods high in carbohydrate.

Glycogen replacement is most effective in the first 2 hour after exercise. A 50g snack high in carbohydrate should be taken immediately after exercise. A 50g snack high in carbohydrate should be taken immediately after exercise. This can be in either liquid and/or solid form.

Examples of suitable carbohydrate snacks include: 2 large bananas, or 3 slices of bread with jam/honey, or 1 large banana and 1 bottle (500mls) of isotonic sports drink. This snack should be followed within two hours by a meal high in carbohydrate.

Timing for Food and Fluid Intakes

Before Exercise

The pre-exercise meal or snack should be familiar to the athlete and contain small amounts of fat and fiber in order to promote quick digestion and minimize potential gastrointestinal discomfort. The meal should be high in carbohydrates and moderate in protein. The amount of carbohydrate shown to enhance performance generally ranges from 200-300 grams of carbohydrate eaten 3-4 hours before an event.

Fluid should be consumed at least 4 hours before an exercise event. A Water or sport beverage is appropriate. The athlete should aim for 5-7 Ml/kg (2-3 mL/lb) body weight of fluid for optimal performance. Hyper hydration with water and glycerol mixtures should be discouraged since no performance benefit has been established by this practice.

During exercise

Sports drinks containing 6-8% carbohydrates are beneficial for exercise lasting longer than 1 hour in duration. For long workouts or events, athletes are advised to consume 0.7g carbohydrate/kg body weight (approximately 30-60 grams/hour). Research has demonstrated an extended endurance performance from this practice. Sports drinks offer a significant benefit for athletes who exercise in the morning after an overnight fast when liver glycogen levels are low. Supplementing carbohydrates during this type of exercise will also benefit athletes who have not eaten a pre-exercise meal as well as those who are restricting calories for weight loss.

The greatest improvements in performance have been observed when sports drinks are used for hydration at 15-20 min intervals. Liquid mixtures of glucose, fructose or other simple sugars are equally effective. However, fructose alone is not as effective and may cause diarrhea.

Consumption of sports beverage that contains electrolytes will help to maintain a fluid and electrolyte balance. Drinks that contain sodium and potassium will aid in the replacement of electrolyte lost in sweat. Sodium consumption will also encourage the drive to hydrate. Sweat losses of greater than 2% of total body weight negatively influence athletic performance so adequate fluid replacement during exercise is chief priority.

After exercise

The post-exercise meal depends on the length and intensity of the exercise, as well as timing of the next exercise session. When multiple bouts of training are expected in the same day, carbohydrates should be

consumed within 30 minutes after exercise in order to fully replenish glycogen stores in the muscles. Consuming 1.0-1.5 grams of carbohydrates/kg body weight at 2 hour intervals for up to 6 hours is recommended. Post-exercise glycogen synthesis with a combination of simple sugars is more effective than fructose alone. Including portions of protein after exercise will help to build and repair muscle tissue.

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 t 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 1.2 to 3.1 g 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.

The right nutrition can support athletes in many ways:

IMPROVED PERFORMANCE

With the proper nutrition, athletes will able to train harder and recover faster as well as maintain a healthy weight.

PREVENT INJURIES

A good eating plan will ensure good bone structure and help to prevent injuries, which can keep athletes out of competition.

IMPROVE RECOVERY TIME

The right balance of protein, carbohydrate as well as vitamin and minerals can help them to recover from workouts and competitions more quickly.

REDUCE STRESS

A healthy diet can improve mental focus and performance.

CONCLUSION

Athletes regularly engaging in strenuous exercise programs should be aware of their daily nutritional needs. Maintaining a healthy diet that provides adequate energy and nutrients is vital to support intense training as well as to optimize immune system functions.

Diet is of great importance for athletes, the key to achieving an optimal sports diet in relationship to peak performance and good health is balance. Athletes must fuel their bodies with the appropriate nutritional foods to meet their energy requirements in competition, training and recovery. If these nutritional needs are not met, there is an increased risk of poor performance and health issues.

The use of nutritional supplement within established guidelines is safe, effective and ethical.

The food athletes consume impacts their training, performance, and recovery. In sports nutrition, the type of food matters, but so does the timing of what they eat throughout the day. It also influences the efficiency level and their body's subsequent recovery after an exercise.

Before a game or contest, an athlete must pay special attention to when and how much it eats or drinks.

Sports Nutrition is the topic of constant change and has grown as a dynamic field of the clinical study. Sports nutrition plays a major role in success of any type of the player. Certain nutrition and the dietary approaches are helpful in good performance of an athlete and should vary in accordance to the type and the intensity of training, type of sports event, environmental factors, eating habits and other specific requirements.

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