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Sports and Nutrition

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Abstract
The diet of an organism is what it eats, which is largely determined by the availability, the processing and palatability of foods. A healthy diet includes preparation of food and storage methods that preserve nutrients from oxidation, heat or leaching, and that reduce risk of food-borne illnesses. Nutrition is the science that interprets the interaction of nutrients and other substances in food (e.g. phytonutrients, anthocyanins, tannins, etc.) in relation to maintenance, growth, reproduction, health and disease of an organism which includes food intake, absorption, assimilation, biosynthesis, catabolism and excretion. An athlete's daily energy intake (total Calories or kilojoules) provides for immediate energy needs such as that for body functions, activity and growth. In addition, energy intake also influences the body's energy stores. Energy stores (body fat + glycogen in muscle and liver) play important roles related to exercise performance, since they contribute to:
• An athlete's size and physique
• function
• Fuel for exercise

Keywords: diet, nutrients, absorption, assimilation, biosynthesis, catabolism, excretion

Introduction
The amount, composition and timing of food intake can profoundly affect sports performance. Good nutritional practice will help athletes train hard, recover quickly and adapt more effectively with less risk of illness and injury. Athletes should adopt specific nutritional strategies before and during competition to help maximize their performance. Athletes will benefit from the guidance of a qualified sports nutrition professional that can provide advice on their individual energy and nutrient needs and also help them to develop sport-specific nutritional strategies for training, competition and recovery. A diet that provides adequate energy from the consumption of a wide range of commonly available foods can meet the carbohydrate, protein, fat and micronutrient requirements of training and competition. The right diet will help athletes achieve an optimum body size and body composition to achieve greater success in their sport. When athletes restrict their food intake, they risk nutrient deficiency that will impair both their health and their performance. Careful selection of nutrient-dense foods is especially important when energy intake is restricted to reduce body and/or fat mass.

Vegetarian Considerations
Many athletes, especially female athletes, adopt a vegetarian lifestyle. This personal choice can be very healthy, and is in no way incompatible with success in sport. However, it does mean that athletes must be more aware of the food choices that they make in order to maintain energy levels, meet training and recovery needs, and to support proper immune function. Plant-based, high-fibre diets may reduce energy availability and athletes should monitor body weight and body composition to ensure energy needs are being met. Female athletes may use vegetarianism as a means to restrict calorie intake in order to achieve a desired physique. Severe calorie restriction may compromise performance as well as reproductive health and bone health. Although most vegetarians meet or exceed their protein requirements, plant protein quality and digestion is decreased and often requires an intake of approximately 10% more protein than if consuming animal proteins. Protein recommendations for vegetarian athletes are approximately 1.3-1.8 g/kg/day from a variety of plant protein sources. This fact may be of more concern for vegans — those who avoid all animal proteins, such as meat, eggs and milk. If there are no animal foods in the diet, then a Vitamin B12 supplement may be necessary. Some vegan food products, such as meat substitutes, are B12 fortified. Iron intake from plant sources should be combined with other foods that aid iron absorption. Dairy produce should be included in the diet to ensure an adequate calcium intake, but many calcium-fortified foods are also available. Vegetarian athletes may also be at risk for low intakes of fat, riboflavin, Vitamin D and zinc, which should be monitored and supplemented in the diet if necessary.

Fuel Needs for Training and Recovery
Carbohydrate provides an important but relatively short-lived supply of fuel for exercise that must be refilled each day from carbohydrate foods in the diet. The athlete's everyday eating plan needs to provide enough carbohydrate to fuel their training program and to optimize the recovery of muscle glycogen stores that are depleted during workouts. General targets can be provided for carbohydrate needs, based on the athlete's size and the demands of their training programme. However, actual needs are specific to the individual athlete and need to be fine-tuned with consideration of the athlete's total energy needs, specific training needs and feedback from their training performance. Carbohydrate intake should be scaled down or up according to the fuel needs of training or competition, and some consideration given to arranging when it is consumed around key workouts or competition events over the day to promote good fuel availability for performance and recovery. It is valuable to choose nutrient-rich carbohydrates and to add other foods to recovery meals and

snacks to provide a good source of protein and other nutrients. These nutrients may assist in other recovery processes, and in the case of protein, may promote additional glycogen recovery when carbohydrate intake is below targets or when frequent snacking is not possible. Carbohydrate-rich foods with a moderate to high glycemic index (GI) provide a readily available source of carbohydrate for glycogen synthesis and should be the major fuel choices in recovery meals.

Protein needs for training and bulking up

Protein has been considered a key nutrient for sporting success by athletes of all eras. Ancient athletes were reported to eat unusually large amounts of meat, today's athletes are provided with a vast array of protein and amino acid supplements to increase their protein intakes. Protein plays an important role in the response to exercise. Amino acids from proteins form building blocks for the manufacture of new tissue, including muscle, and the repair of damaged tissue. They are also the building blocks for hormones and enzymes that regulate metabolism, support the immune system and other body functions. Protein provides a small source of fuel for the exercising muscle. Some sports scientists have suggested that endurance and resistance-training exercise may increase daily protein needs up to a maximum of 1.2-1.6 g per kg body weight (BW), compared to the recommended intake of 0.8 g/kg BW for a sedentary person.

Vitamins, Minerals and Antioxidants for Staying Well

Strenuous bouts of prolonged exercise and heavy training, particularly aerobic exercise, stress the body both physically and mentally. Adequate intakes of energy, protein, iron, copper, manganese, magnesium, selenium, sodium, zinc, and Vitamins A, C, E, B6 and B12 are particularly important to health and performance. These nutrients, as well as others, are best obtained from a varied and wholesome nutrient-rich diet based largely on vegetables, fruits, beans, legumes, grains, lean meats, dairy foods and healthy oils. Dietary surveys show that most athletes are well able to meet the recommended intakes for vitamins and minerals by eating everyday foods. Antioxidant nutrients help the body neutralize harmful oxidizing products that may accumulate during intense or prolonged training and potentially damage healthy tissues and impair proper recovery. It is not known whether hard training increases the need for dietary antioxidants, as the body naturally develops an effective defence with a balanced diet. Antioxidants are safest and most effective when consumed in abundance as plant-derived foods from a wide variety of sources (e.g., fruits, vegetables, nuts, seeds, whole grains, teas and non-medicinal herbs, etc.)

Iron

Some athletes may develop iron deficiency and this will impair performance. Unexplained fatigue, especially in vegetarian athletes, should be explored. Routine use of iron supplements is not wise: too much is just as harmful as too little. Self-medication with iron supplements may not address the real causes of an athlete's fatigue or other issues of poor eating and may do more harm than good.

Calcium

Calcium is important for healthy bones, especially in adolescents and in female athletes, so it is important to ensure adequate calcium intake. The best sources are dairy produce, including low-fat varieties. Each athlete should aim to include at least 3 servings of these foods in their daily eating plans (e.g. milk, cheese, yoghurt). Additional daily servings are required during growth spurts in childhood and adolescence, and for pregnancy and lactation. Fortified soy foods may provide a useful substitute for athletes who cannot consume dairy foods.

Diet for Competition

Many athletes appreciate to eat well during the days prior to competition. Carbohydrate is the key energy-providing nutrient that must be optimized during the days leading up to and including the day of competition. Attention should also be given to optimize water and salt levels in the body.

Carbo-Loading

Athletes who compete intensely for more than about 90 minutes benefit from 'carbohydrate loading' for a few days. This loading of muscle glycogen to super-compensated levels can be achieved within 1-3 days by eating a large amount of carbohydrate (about 8-10 g CHO per kg of body weight per day) at the same time that training intensity is reduced to no more than easy levels of short duration.

Fluid Intake

Athletes should drink sufficient fluid with meals on the day before competition to ensure adequate hydration on the morning of competition. The athlete should not refrain from drinking water or carbohydrate-containing fluids during the hours leading up to warm-up before competition and it is recommended that athletes have a final drink during the 60- to 90-minute period before the start of the event. During competitions lasting longer than 1 hour and which cause heavy sweating without sufficient opportunity for fluid intake, athletes often benefit by having an extra drink during the 15-minute period immediately before the start of the event.

Fluid, Carbohydrate and Salt Needs During and After Exercise

Athletes should generally limit dehydration during workouts and competitions by trying to drink at a rate that is close to sweat rate and thus limit loss of body weight It may not be necessary to drink enough to prevent loss of body weight, but the amount of dehydration should be limited to no more than about a 2% loss of body weight Greater losses will negatively impact performance. Replacement of water and salts lost in sweat is an essential part of the recovery process. Aim to drink about 1.2-1.5 litres of fluid for each kg of weight loss in training or competition. Drinks should contain sodium if no food is eaten at this time. Sports drinks and pharmacy oral rehydration solutions that contain electrolytes are helpful, but many foods can supply the salt that is needed. A little extra salt may be added to meals when sweat losses are high, but salt tablets should be used with caution.

Recovery after exercise is part of the preparation for the next exercise session, and all athletes, including strength and power athletes, will perform below their best if they are not well hydrated when they begin exercise.

Needs of the Young Athlete

Athletes should be encouraged to develop good nutritional

habits at an early age. Adolescence is a time marked by an increased independence, and this extends to greater freedom of food choice and greater responsibility for food preparation. The promise of sporting success may provide strong motivation to develop good dietary practices. Information and the example of good role models may help a young person to develop sound eating practices in everyday (training) diets as well as the specific preparation for competition. The physiology of children and adolescents differs from that of adults in several ways. The mechanisms of thermoregulation are less effective in children, and special attention must be paid to the environment, activity patterns, clothing and hydration to avoid problems of hyperthermia or hypothermia. The rate of obesity in children is still rising, but active youngsters do need a plentiful supply of energy from foods and energy-containing drinks. Young athletes have been shown to drink more of a flavored sports drink than water during activity, which is an important consideration especially if exercise is in the heat. Sports drinks should be made available to encourage more fluid intake. Many young athletes are eager to increase the rate of their growth and muscular development in pursuit of the physique of an adult. While growth and maturation are genetically determined, high-energy eating plans can assist the young athlete to maximize the outcomes of growth and specialized training programmes. Young athletes eating a wide range of foods should not need to use dietary supplements, including the use of energy drinks which contain high amounts of caffeine and are not suitable for young athletes. Athletes and coaches should be aware that supplements do not provide a short-cut to success.

Dietary Needs for Endurance Sports

Endurance athletes with very high energy needs may find it valuable to spread their daily food intake over a series of meals and snacks. Drinks providing carbohydrate (sports drinks, soft drinks, juices, fruit smoothies and milkshakes) also provide a compact way to refuel. The main factors causing fatigue during competition are fuel (carbohydrate) depletion and dehydration. Strategies for eating before, during and after the event are important to reduce these effects. Competition is often undertaken in multiple stages, or as a series of heats and finals. Recovery between sessions can be important in determining the final winner. Eating strategies for the athletes to achieve carbohydrate intake targets to meet the fuel demands of training and recovery.

Data Analysis

Table 1: Showing Intake of Male Athletes Mean

Nutrient	Observed	Recommended
Carbohydrates	403.07 ± 86.03	-
Proteins	91.62 ± 33.31	100 - 120
Fats	75.83 ± 18.41	-
Calcium	1079.38 ± 294.56	1000 - 2000
Folic acid	209.94 ± 155.29	-
Vit C	128.88 ± 88.46	100 - 200
Energy	2661.69 ± 535.86	4320

Discussion

From the above data it has been found that the nutritional requirement of athletes is inadequate. The need for proper nutritional fulfillment should be looked after. Healthy, nutritious food should be recommended.

Conclusion & Recommendation

Nutrient-dense carbohydrate choices, and the addition of protein-rich foods and Vegetables to meals will help to balance fuel needs and other nutrition goals. Sugary foods and drinks provide a compact form of carbohydrate, which is particularly useful when energy needs are high or in situations when it is impractical to eat bulky foods. An infinite variety of different food combinations can be chosen by athletes to meet their nutritional goals. All the essential nutrients can be obtained from normal foods, and variety is a key to meeting nutrient needs, but many different foods can be interchanged.

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