Nutrition in Sportsmen

Sporcularda Beslenme

Banu B. Kalpakçıoğlu

Department of Physical Therapy and Rehabilitation, Haydarpasa Numune Training and Research Hospital, Istanbul, Turkey

Abstract

Everyday we are made aware of the need for proper preparation to maximize performance in sport, and this no longer applies only to the elite. In the 17th century the notion of nutrition and diet changed in European countries (Manz, 2001). First chemical experiments relied on the idea that salts resulted from a union of acids and bases, and digestion was no more regarded as a process of cooking but a succession of fermentations controlled by a balanced production of acids and alkali. Consequently, life seemed to depend on the equilibrium of acids and alkalis. In the 19th century food was systematically analyzed for the content of energy and macronutrients and the first scientifically based nutritional standards were then formulated. New methods to determine the concentration of nutritional elements promoted physiological and clinical research within acid-base metabolism after the 1950s. In this review basic answers to potential questions regarding the nutrition of sportsmen are given. *(Rheumatism 2008; 23: 24-7)*

Key words: Nutrition, sportsmen, exercise

Özet

Sporda, performansımızı maximum seviyeye çıkartmak için doğru bir şekilde hazırlanmanın önemini her gün biraz daha iyi anlıyoruz ve bu durum artık sadece sosyokültürel düzeyi yüksek kişilere özel degil. 17. yüzyılda, Avrupa ülkelerinde beslenme ve diyet nosyonu değişmeye başladı. İlk kimyasal deneyler, tuzun, asit ve baz bileşiminden sonuçlandığı üzerine idi ve sindirim, asit ve alkali ürünlerin fermentasyonu sonucudur fikri doğdu. Sonuç olarak, yaşamın asit ve alkalilerin dengesine dayalı olduğu düşünüldü. 19. yüzyılda, yiyeceklerin enerji ve makrobesin içerikleri açısından analizleri yapıldı. 1950'li yıllardan itibaren besinlerdeki elementlerin konsantrasyonlarını belirlemek üzere yeni metotlar geliştirildi. Bu derleme, sporcuların beslenmeleri üzerine olan birçok soruya temel yanıtlar içeriyor. *(Romatizma 2008; 23: 24-7)*

Anahtar kelimeler: Beslenme, sporcu, egzersiz

Introduction

Muscle strength and power are essential determinants of performance in short maximal exercise requiring high muscle force production, such as weight lifting, throwing and jumping, or sprinting (1). A majority of the athletes involved in strength and power sports ingest nutritional supplements with the express purpose of enhancing muscle strength. Muscle strength can be defined as "the maximal amount of torque (S.I.unit:Newtonmeter, Nm) or force (S.I.unit: Newton, N) that a muscle or muscle group can voluntarily exert in one short maximal effort, when type of muscle contraction, movement velocity and joint angle are specified' (2). Similarly muscle power can be defined as "the maximal amount of work per unit of time that can be performed in one short dynamic effort" (3).

The energy for exercise comes mainly from carbohydrates stored in muscle as glycogen. A diet high in carbohydrates is essential, with as much as 60-65 per cent of the calories are supplied through this source. The total calorie intake reflects the total calories used up and may be as much as 3.000-4.000 calories. In sports such as boxing or gymnastics where weight is to kept under strict control, the need to balance calories taken and consumed is essential. Any imbalance can lead to serious health problems such as the loss of periods (amenorrhoea) and stress fractures.

It is easier for the body to replenish glycogen in the first two hours after exercise because of changes in insulin sensitivity during and immediately after exercise. This can come out to be vital if training is continued over long periods or through repeated terms during the day, so feeding after exercise or taking high calorie drinks containing glucose polymers can be helpful to assimilate carbohydrates in as quickly as possible.

A normal diet (especially for non-vegetarians) consists of enough protein for sportsmen, even those doing a lot of weight training. Sportsmen need to eat a balanced diet which contains fruit, vegetables and fiber. If the diet is poor there may be deficiencies, but the answer, even for the busiest professional sportsmen, should be to eat a proper diet (4). In all sports the important part of the energy production is supplied through carbohydrates, and it is merely the total calories that vary according to the intensity and duration of

Address for Correspondence /Yazışma Adresi: Banu B. Kalpakcıoglu, MD Department of Physical Therapy and Rehabilitation, Haydarpasa Numune Training and Research Hospital, Istanbul, Turkey E-mail:banubolay@superonline.com

exercise. Shortage of carbohydrates is a major contributor to fatigue. Fatigue may lead to risk of injury that can be prevented by efficient nutrition.

Questions to determine the extent and type of exercise rest with the individual. The American College of Sports Medicine recommends exercise intensity for average sportsmen (with the pulse rate up to 60-75 per cent of maximum-220 beats per minute minus age) for 30-60 minutes three to five times per week. This is too much for the beginner who should build up exercise gradually. Increasing total workload by 10 per cent per week will minimize the potential risk of injury. For people who are not professionals but want to pursue a healthy life through sports exercises are also essential. For them, the recommendations are to accumulate 30 minutes or more of moderate exercise (climbing the stairs, brisk walking, vacuuming the house, gardening etc) for a few times a week could suffice.

Extreme (anaerobic) exercise has no health benefit, but has considerable performance benefits. Exercise at extreme levels leads to accumulation of lactate and formation of fatigue immediately. Moreover, potential exercise benefits (such as lowering heart attack risk, regulating blood pressure and cholesterol levels as well as reducing diabetes risk) do not apply to short periods of extreme exercise.

In order to lose weight diet and exercise must be combined to be effective. Exercise must use up a considerable amount of energy over a long period to be effective. To begin to lose weight without losing health a person should receive help and advice from a doctor and a chartered physiotherapist.

The important first step is the diagnosis. A clinic with access to diagnostic scans with doctor and experienced staff should be trained specifically in sports medicine.

The use of analgesics is hotly debated, especially non-steroidal anti-inflammatory drugs (NSAIDs). There is evidence that they are useful in the early period (three to five days). Topical NSAIDs have recently been reviewed in the BMJ and have been shown to reduce pain effectively in some people. This may speed mobilization of an injury and so speed up recovery. Analgesia should never be used as a means of masking an injury and getting back to sports early, which runs the risk of making a minor injury worse (5).

If proper rehabilitation techniques are used, then recurrence can be prevented. The ankle and thumb are most easily and effectively taped. Early taping of the ankle after injury may enable early mobilization and walking and therefore help in the treatment. Rubber and neoprene supports are not helpful for healing. It should also be noted that, during most sports exercises, 'internal heating' will be far more effective than any external warming, and there is no scientific evidence to prove benefit from the use of soft joint supports. Advice from a physiotherapist is recommended before using a support for a serious injury. It should not be used as a short cut, but if using a support gives a sportsman confidence, it may be useful.

Some of the misconceptions regarding nutrition commonly between the groups on important aspects of nutrition knowledge are elaborated below (6):

- Most of the sportsmen thought that they should not drink fluids during competition, a practice which could have serious physical consequences such as dehydration and nervous system dysfunction (7). Water must be available at all times during practice and competition.

-A large number of the sportsmen believed that food could not provide enough nutrients and that vitamin pills were necessary for good health. A healthy diet that includes a variety of foods does not require vitamin and mineral supplements. Beitz et al (8) found that the people using dietary supplements in their food intakes do not have much difference in daily performance compared non-users.

-The sportsmen are tended to think that sweets would provide quick energy just before competition. This prejudice may lead to rely on candy to provide the energy that should come from complex carbohydrates. The underlying goal of eating candies before exercise is to boost energy minimizes insulin surge that transports sugar out of the bloodstream and into the muscles. Simple sugars induce high insulin, when used before exercise this can lower the blood sugar and elicit the fatigue as well as lightheadedness associated with hypoglycemia.

-Excessive intake of highly concentrated sugars, such as candy and soft drinks in a short period of time can result in cramps and bloating.

-Some sportsmen believe that carbohydrate-rich foods such as potatoes, bread, and rice provide few nutrients other than calories. However, these complex carbohydrates, as well as those provided by fruits and vegetables, are excellent sources of vitamins, minerals, and fiber.

Some sportsmen believe that protein is the primary source of muscular energy for sports. While protein is necessary for muscle growth and repair, it is not a primary source of energy. It is more efficient for the body to get energy from carbohydrates, but if carbohydrate intake is low, then the body must use protein. Extra metabolic processes are necessary to use protein for energy, and once protein is used for energy it is no longer available for growth and repair.

If sportsmen have difficulty in building muscles, it is usually not due to low protein intake but rather to low caloric intake. Once protein needs are met, it is necessary to concentrate on additional calories in the form of complex carbohydrates. For example, to build one pound of lean tissue, a sportsman must consume approximately 98 grams of protein and 2.800 calories for extra energy to synthesize muscle (7). If this were the sportsman's goal for a week it would mean 14 grams protein and 400 calories per day in addition to the usual diet. Fourteen grams of protein can be obtained in two glasses of milk or two ounces of lean meat. With a small amount of additional protein and enough fuel from complex carbonhydrates, muscle building can occur. Elia et al (9). found that whey protein supplementation of regular diet can prevent oxidative stress regardless of training for sportsmen. Accordingly athletes consuming soy and whey-protein supplements could train with higher exercise intensity, where the antioxidant effect of the two proteins was based on different mechanisms of action.

The sportsmen believed that certain foods burn fat-a persistent fallacy. The only way fat is used is in normal metabolic processes of living and moving. Fat is 'burned' when the energy used by the body exceeds the amount consumed in food. The sportsmen believed that a diet with little or no fat is the best diet for sportsmen. However, fat does have a role in a healthy functioning body. Fat provides protection and is an important component of the nervous system. Dietary fat provides sportsmen with essential fatty acids and carries the fat soluble vitamins A, D, E, and K.

Sportsmen have high caloric needs because of their high activity levels. If they eat little fat, the volume of food (eaten as carbohydrates and proteins) necessary to supply the needed calories becomes prohibitive. Fat is a concentrated form of energy. Sportsmen can use it in sensible amounts. Nutritional guidelines suggest no more than 30 percent of total calories come from fat. Food labeling makes it easier for young people to calculate their fat intake. For a typical 2.000-calorie diet, 30 percent fat would mean 600 calories from fat. At nine calories per fat gram, approximately 60 grams of fat would be an appropriate daily amount. More than two-thirds of the fat should be in unsaturated forms. Because saturated fat has been associated with heart disease, it is wise to reduce the saturated fat intake. Foods high in saturated fats are usually from animal sources and include red meat and whole milk. Unsaturated fats are typically oils and are soft or liquid at room temperature.

Some sportsmen do not realize that, in addition to citrus fruits, potatoes, strawberries, and cantaloupes are good sources of vitamin C. It is important to know that there are other sources of this important vitamin because it is not stored in the body and must be replenished daily.

Sportsmen may require higher sodium levels than less active people because of sodium lost in perspiration. Salt pills are not necessary, but additional salt with food or even the sports drinks with their additional electrolytes may help sportsmen function at top efficiency.

Water is still the most necessary nutrient for the body. Sportsmen who do not replace fluids lost during practice or competition can become chronically dehydrated which lead to a decline of performance. Thirst is often blunted during times of heavy activity. Sportsmen must learn to drink before they become thirsty and to continue drinking after their thirst is gone. Drinking fluids on a regular schedule during practice or competition helps prevent dehydration. Sportsmen should weigh them before and after a workout. By replacing every pound lost with two cups of fluids, sportsmen can ensure that all lost water is replaced.

Calcium and iron are two important minerals for sportsmen. Dairy products are obvious sources of calcium. Many sportsmen do not realize how necessary a good calcium supply can be. They may not be concerned with the threat of osteoporosis in their youth. Stress fractures can be debilitating and affect a sportsman's ability to train and compete. Adequate calcium strengthens bones and goes a long way toward preventing stress fractures.

Iron, the centerpiece of the red blood cell, is vital for getting oxygen to all the cells, an important requirement for sportsmen. Sportswomen are at risk if they do not receive enough iron for then blood losses associated with menstrual cycles and tendency to restrict calories would be negatively affected. Red meats are an excellent source of iron. Fruits and vegetables have some iron, and foods containing vitamin C increase iron absorption from other foods.

Creatine supplementation is also another source to increase strength, enhance work performed during consecutive sets of muscle contractions, improve repetitive sprint performance, and increase body mass/fat free mass ratio (10). Creatine has become one of the most popular nutritional supplements among athletes recently, where the only reported side effect is weight gain (11). Kreider (12). found that creatine supplementation was a generally effective nutritional ergogenic aid for a variety of exercise tasks in a number of athletic and clinical populations.

Finally the choice of exercise can affect the injury risk. Some sports - swimming, cycling and aerobics - carry a low risk of injury compared with rugby and football. So directing a potential exerciser towards a safe sport is sensible, though they should enjoy their choice if they are to benefit from regular exercise.

It should also be noted that education about which type of nutrition is to be chosen is vital for adolescent sportsmen, especially if they are from low-income strata of societies. Little et al. (13) found that adolescents from low-income communities receive less educational resources and support and may possess insufficient knowledge of nutrition and sport supplements to make health-conscious decisions. So, a short-term nutrition education program can significantly improve nutrition and sport supplement knowledge in high school students of low socioeconomic status who are candidates of successful sportsmen of the future.

Recommendations

A good food plan for young sportsmen is a well-balanced, nutrient-dense diet. This plan will provide adequate amounts of most nutrients (14). Sportsmen need to obtain at least 60 percent of their total calories from a variety of complex carbohydrates such as grain products, fruits, and vegetables. These carbohydrates provide energy plus vitamins, minerals, and fiber to keep all systems functioning at peak efficiency.

The food pyramid published by the United States Department of Agriculture, shows that complex carbohydrates should comprise the bulk of the diet. An adolescent girl should have at least nine servings from the bread and cereal group, four servings from the vegetable group, and three servings of fruit each day. One slice of bread or one-half cup of a food is generally considered to be a serving (15).

Meat and dairy products are also very important, but in smaller amounts. They are needed especially for protein and minerals. Adolescent sportsmen need two to three servings from the dairy group and two servings from the meat group daily. Water and liquids such as juices are vital for proper hydration, a necessary component of athletic excellence. Foods to avoid are ones full of calories with no other nutrients.

Soft drinks or deep fried foods such as doughnuts are full of sugar and/or fat. These foods supply calories but little or no vitamins and minerals to keep the body running well.

Coaches can help enhance the performances of their sportsmen by promoting good nutrition. Because sportsmen seek and follow their advice, coaches should find ways to supply useful information. They can schedule a lesson on eating, perhaps calling in a guest expert such as a sports nutritionist. Coaches can provide written guidelines for training meals, display informative posters, and talk about healthy eating. They can be role models at times when food is present. They must have water available at all times during practice and competition. The nutritional support of wise food choices will make it possible for sportsmen to perform to the best of their abilities.

Nutrition stations can be built at sports complexes to weigh the body mass indexes (BMI) of athletes to recognize any normal or abnormal developments taking place within the bodies of sportsmen in time on regular basis (16). Experienced sportsmen and trainers should pursue ways to educate young people on how to select nutritious foods that will promote a lifetime of good health.

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