

# SPORTS MEDICINE

## Fuel your performance all winter long!

Part 1: Understanding how the right energy sources can enhance performance

by André Albrecht, sports nutritionist

Sport-specific nutrition is a never-ending discussion—after all, eating and drinking are essential to life! There were plenty of water jugs to be seen on the sidelines in summertime, but now that the weather's cooled off and players aren't sweating so much, most of them seem to have disappeared. Big mistake! Physical exertion depletes an athlete's energy reserves no matter what season it is.

Most people underestimate the importance of eating well before matches. In this article, we lay out the seven basic building blocks of nutrition and their significance for the game of soccer, then provide some tips for proper pregame nutrition.



Photo: Axel Heimken

### The building blocks of nutrition

#### Carbohydrates

This category includes monosaccharides (glucose, fructose), disaccharides (sucrose), oligosaccharides (maltodextrin) and polysaccharides (starches in noodles, bread, potatoes, etc.).

#### Proteins

Proteins are chemical compounds made up of amino acids and are found in meat, fish and grains. Obtaining sufficient protein is normally not a problem, and protein supplements such as recovery drinks are recommended only in unusual situations, e.g. intensive strength or speed training.

#### Fats

Fats and oils consist mainly of fatty acids. These may be unsaturated (in chemical terms, having double bonds) or saturated (no double bonds). Certain fatty acids cannot be produced by the human body, so they must be supplied in food. These "essential" fatty acids can

be found in large quantities in high-quality cooking oils. Beyond the required amounts of essential fatty acids, fat consumption should be kept to a minimum.

#### Vitamins

These vital organic compounds occur in two forms: fat-soluble (A, D, E, K) and water-soluble (B1, B2, B6, B12, folic acid, pantothenic acid, niacin, biotin, C). Since the human body is unable to produce most of these, they must be supplied in food. A varied diet will generally provide sufficient quantities.

Athletes' vitamin requirements tend to be higher than average, depending on the intensity of the sport played, because their bodies consume primary nutrients more rapidly.

#### Minerals

Sodium, potassium, calcium and magnesium can be found to varying degrees in numerous foods. Trace elements such as iron, zinc and selenium fall into this category as well. Heightened physical activity

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increases the body's mineral requirements, so mineral intake must increase accordingly (e.g. table salt when players are sweating heavily).

### Fiber

Because of its bulk, fiber stimulates the action of the intestines, helping to push food through them. It is found primarily in plant material and consists of carbohydrates such as cellulose, which the human body is unable to digest.

### Water

The adult human body is approximately 65 percent water (the proportion for children is over 70 percent). A deficiency of just two percent by weight can lower an athlete's endurance, while deficiencies of over four percent can have a severe effect on performance and normal physical function.

If you wait until you feel thirsty, it may already be too late: The body

doesn't start asking for more until it's lost a liter of fluids—but by then, athletic ability is already diminished. Special sports drinks can supply the body with carbohydrates and minerals as well as water. Besides drinking, we also get water from our food.

### Vast energy reserves

Carbohydrates, fats and proteins are our energy sources. The majority of our energy is provided by carbohydrates and fats; proteins have only a minor role to play here.

The human body actually possesses enormous energy reserves. Its fat reserves alone would theoretically be sufficient for weeks of easy hiking. However, we still need to consume carbohydrates on a regular basis. One reason is that the body needs the "fire" of carbohydrates to burn fat—i.e. our fat reserves are unusable unless we have carbs as well.

Furthermore, the brain can only get energy from carbohydrates; they are also an important source of direct energy for the muscles. The

## NUTRITIONAL RECOMMENDATIONS FOR SOCCER PLAYERS

### EATING BEFORE THE GAME

#### When, what and how much?

First and foremost, meals before any athletic activity should be rich in carbohydrates.

The last big meal should be eaten three or four hours before the game starts; players with sensitive stomachs should limit their fiber intake. In the hour before the game it's a good idea to consume an additional

60–80 grams of carbs, to make sure players' carbohydrate reserves are full when they hit the field. That might come from a banana, an energy bar or a sports gel. Energy bars tend to be packed with fat, though—especially the nut-flavored ones—so make sure the ones your players are eating contain no more than five percent fat.

### DRINKING BEFORE THE GAME

#### Water is essential!

Water is necessary for life. Almost every chemical reaction in the human body takes place in aqueous solution. That's why even a small shortage of water can cause a significant drop in performance, while larger deficiencies can lead to a life-threatening situation. In other words, a steady supply of water is a must for any athlete.

Soccer players should begin filling their water reserves several hours before a match or practice session, ideally as soon as they get up in the morning. They should drink enough so that their urine is clear two or three hours before they play. Yellow urine can be an indication of dehydration.

Just before the game, players can cut back somewhat on their water intake so they don't feel waterlogged as the game begins, and also to reduce the load on their bladders during play.

The optimal amount to drink before a game cannot be given as a rate of so many liters per hour because it depends on a number of factors. These include the prevailing humidity and air temperature as well as each player's individual characteristics, e.g. tendency to sweat. How-

ever, players can develop a feel for the right amount over time, ideally starting in childhood.

#### Which drink is the best?

Ordinary mineral water is sufficient to fill up the body's water reserves. Players should cut back on carbonated beverages as game time approaches and stay away from them completely just before and during play (including halftime!).

To replenish the necessary minerals as well, the water they drink needs to contain plenty of sodium, potassium, calcium and magnesium. Although many athletes drink low-sodium water, they should make sure it contains at least 100–120 milligrams per liter. The body loses a lot of sodium through perspiration, and a lack of sodium during athletic activity can cause cramps.

Athletes can drink their carbs as well. If they do, the exact carbohydrate content of their drink of choice is relatively unimportant up to two or three hours before game time. Fruit juice and soft drinks typically contain 100–120 grams of carbs per liter, although they're pre-

more we increase our running speed, for example, the more heavily we draw on carbohydrates for energy.

Unfortunately, the carbohydrate reserves in our muscles and liver are quite limited and only sufficient for 60 to 90 minutes of exertion. Once they're used up, we "hit the wall"—in other words, we experience a drop in performance, a loss of concentration, dizziness, heavy perspiration, tunnel vision and a loss of motivation.

### Avoid the wall: Load up on carbs!

A soccer player who's run out of energy reserves is no longer able to keep up with what's happening on the field. As his ability to concentrate decreases, he loses coordination, which makes him more susceptible to injury. Therefore, it's essential for soccer players to consume sufficient amounts of carbohydrates before, during and after matches and practice sessions.

Below, we'll show you how to make sure your players are getting enough to eat and drink before they play.

Players also need fluids with their meals. Sports drinks can be an ideal way of topping up energy reserves in the hour before a game. Along with water and carbohydrates, these drinks also contain minerals and vitamins in easily absorbed form (isotonic, meaning their composition is similar to that of human blood).

dominantly short-chain carbohydrates. That means they enter the bloodstream quickly, providing immediate energy, whereas long-chain carbs are released gradually.

During the last two hours before the game, specialized sports drinks are more appropriate, as these contain a mix of carbs specifically selected for athletic activity. The proper mix of long-, medium- and short-chain carbohydrates provides a steady supply of energy.

### A good sports drink should contain:

- Carbohydrates: 40–80 grams per liter
- Sodium: 4000–1000 mg/l
- Potassium: 120–125 mg/l
- Magnesium: 10–100 mg/l

It should not contain too much fruit juice (acid)—an apple juice right before the game can cause indigestion! The ideal sports drink should include everything the athlete needs and nothing that would impair digestion.

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