The Soccer Diet

What are the different components of a healthy diet for footballers?

Fundamentals of Nutrition for Football

General Guidelines for a Healthy Diet

The plethora of information about nutrition that is being promoted by various sources in the media to the average football player seems to have made this subject a very complicated science. However a general diet for up and coming footballers, including the top professionals is based around the following ten pillars outlined below.

1. Eat a variety of nutrients from the four food groups. (See Below)

    a) Consume four or more servings a day from the Beans, grains, & Nuts, and the Fruit & Vegetable groups.
    b). Consume two servings a day from the Milk Products and the Poultry, Fish, Meat & Eggs groups.

2. Eat foods high in starch (complex carbohydrates) and cellulose (indigestible fibre).
3. Limit your total fat intake to 25% or below of your total daily caloric intake and keep your intake of saturated fats at or below 1/3 of you fat calories.
4. Limit your cholesterol intake to 300 milligrams per day or less.
5. Get your vitamins and minerals from the four food groups not from supplements.
6. Avoid foods high in simple sugars.
7. Limit sodium intake to no more than 2400 milligrams per day.
8. Maintain an adequate intake of calcium.
9. The Drinking of alcoholic beverages should be kept to a minimum at all times.
10. Maintain your ideal lean vs. fat body weight.

- Four Basic Food Groups. Grains (6-11 servings), Vegetables (3-5 servings) and Fruits (2-4 servings), Milk products (2-3 servings),
- Meat, Poultry, Fish, Dry Beans, Eggs and Nuts (2-3 servings)
  With fats, oils, and sweets (should be used sparingly).

Nutrients

Nutrients are chemicals that fulfil specific functions in the body. They provide energy, furnish structural components to construct body tissue, and supply regulators to control metabolic functions. Your local grocery store is the best source for the 37 (three macronutrients, 13 vitamins, and 21 minerals) essential nutrients needed by the body on a regular basis (Forsythe, 1990).

Williams (1988) has identified what he labelled as the ten "key nutrients" that are central to human nutrition (see Table 1.0 below). To help ensure that the established recommended daily allowance (RDA) of the macro-and micronutrients is consumed one must choose foods that have a high "nutrient density" or foods that are high in vitamins, minerals, and fiber but are low in calories.

Table 1.0. Key Nutrients

Nutrient	Plant Source	Animal Source
Carbohydrate	breads, cereals, pastas, fruits, and vegetables	
Protein	Dried beans, and peas & nuts	Fish, Poultry, Meat, Milk & Cheese
Fat	Margarine, Vegetable oils, Salad dressings	Lard, Butter
Vitamin A	Dark green, leafy vegetables, Yellow vegetables,	Butter, fortified Milk, Liver, Margarine
Vitamin C	Citrus fruits broccoli, potatoes, strawberries, tomatoes, cabbage, dark green leafy vegetables	Liver
Vitamin B1 (thiamin)	Breads, Cereals, Nuts	Pork, Ham
Vitamin B2 (riboflavin)	Breads, Cereals	Milk, Cheese, Liver
Niacin	Breads, Cereals, Nuts	Fish, Poultry, Meat
Iron	Dried peas and beans, Spinach, Asparagus Prune juice	Meat, Liver
Calcium	Turnip greens, okra Broccoli, spinach	Milk, Cheese, Mackerel, Salmon

Adapted from Williams, M.H. (1988). Nutrition for fitness and sport. Dubuque, IA: Wm. C. Brown.

Optimal Nutrition for Exercise and Sport

Energy needs for sport and physical activity

Energy needs differ substantially among individuals. Factors, such as, age, gender, body surface area, and environment influence daily caloric output. Also, the number of calories burned in exercise fluctuates with the frequency, intensity, time, and type (FITT) of activity, movement efficiency, and status of physical fitness (Hecker, 1987). College athletes, for example, consume from 19.7 to 62.1 Kcal/kg. Thus a 120 kg (264 lbs) linesman may need as much as 7452 kcal/day to maintain his body weight. Hoeger (1991, p. 39) provides the following table for a quick appraisal of calorie needs by gender and activity level (see Table 1.1).

Table 1.1. Caloric needs by gender and activity level

		Calorie per pound
	Men	**Women**
Sedentary--Limited Physical Activity	13.0	12.0
Moderate Physical Activity	15.0	13.5
Hard Labor--Strenuous Physical Effort	17.0	15.0

Complex Carbohydrates, Proteins, and Athletic Performance

Although the primary source of energy during endurance type exercise is derived from free fatty acids, carbohydrate, in the form of glycogen, is also needed. Several studies, that compared high fat or low carbohydrate diets to mixed or high carbohydrate diets, demonstrated a significant performance advantage to the high carbohydrate groups (Keith, 1989).

Consumption of adequate amounts of protein is crucial in order to increase muscle bulk. A normal diet that provides 15%-20% of calories in protein, however, seems to sufficient. Very heavy exercisers may need additional 25 grams of protein for every additional 1000 Calories burned.

Vitamins, Minerals and Athletic Performance

There is absolutely no evidence that a high quantity intake of vitamins and/or minerals improve performance. However, less than optimal levels of vitamins and minerals do hinder performance. Research has shown that athletes need and actually consume larger amounts of calories. Since a well balanced diet of 1200 Kcal will supply all the micronutrient needs of an adult, an athlete consuming a balanced daily diet of 3600-6000 Kcal will also ingest 3-5 times the RDA for vitamins and minerals! While it is relatively hard to vitamin or mineral overdose oneself through food consumption, it is fairly easy to achieve vitamin toxicity, for example, with the abuse of commercial vitamin pills (Aronson, 1986).

Water for Maximum Performance

A loss of water that exceeds 2 percent of one's body weight significantly impairs endurance performance. Therefore, it is recommended that athletes drink lots of water, before, during, and after working out. After exercising in hot and humid environments for one hour a water loss of up to .5 lbs per mile may occur. To replace fluid loss under these conditions, an exerciser would have to drink one cup of water (8 oz) every mile or 6-8 minutes (Nieman, 1990). To systematically hydrate during exercise it is recommended to consume 200-400 ml of cold (40-50 F) every 15-20 minutes.

Should electrolytes be used during soccer practice or a soccer match?

According to Nieman (1990), studies have demonstrated that losses of sodium, magnesium, calcium, zinc, and some vitamins through sweat are insignificant. Therefore water is a sufficient intake for before during and after a soccer match.

However, individuals engaging in very heavy exercise that lasts over four hours (e.g. Tri-athletes and marathoners), however, need fluids containing electrolytes.

Timing of Food Consumption and Performance

Pre-Event Feeding:

A diet high (65-70%) in complex carbo-hydrates consumed no later than 4-5 hours before competition appears to positively affect endurance type performance. The pre-event meal should not exceed 600 kcal and should be very light in fat (Keith, 1989).

During Event Feeding:

Numerous studies compared the performance of endurance runners or cyclists when either a sport type drink and/or diluted sugary drink or plain water was consumed. Even though results consistently show that carbohydrate beverages outperform plain water, no practical benefits seem to result from carbohydrate ingestion throughout exercise.

Post-Event Feeding:

Ivy, Katz and others (1988) studied the effect of time of carbohydrate ingestion after exercise on muscle glycogen synthesis. They reported that a 23% solution of a carbohydrate drink, in a quantity that supplied two grams of carbohydrate per kilogram of body weight, led to a 300% increase in the rate of glycogen synthesis. Following Ivy and his colleagues' recommendation, soccer players may consume 1.5 g/kg body weight carbohydrates within the first 15-30 minutes after practice or a game. A second feeding should take place about one hour after the cessation of exercise.

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Why are drinking fluids so important when playing sport/football?

Fluids

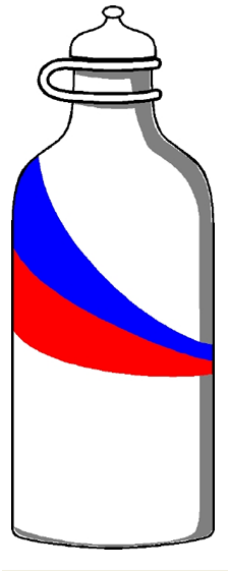
Water is critical to all body functions and makes up about 60 percent of a person's body weight. Water helps move nutrients throughout the body and helps remove waste from the body. Replacing the fluids lost during exercise is essential to sustaining performance, preventing dehydration, and avoiding injury. Even mild dehydration can cause muscle and body fatigue, which will reduce athletic performance. Since thirst is not always a reliable indicator of fluid loss, athletes should drink fluids before they get really thirsty.

Eight to ten cups a water a day is the recommended daily intake for most people. However, extra fluids are needed by athletes to replenish what is lost during exercise. Drinks with caffeine or alcohol should be avoided, as they are dehydrating. Exercising in extreme heat increases fluid needs even more, since more is lost through sweat. Taking in too much water can be just as dangerous as not taking in enough. Athletes should experiment with different fluid intakes to determine the best amounts for optimal performance.

Sports drinks can be helpful, especially for events lasting sixty minutes or longer, after the event. In addition to fluid, they provide the advantage of quick replacement of carbohydrate and minerals and also replace electrolytes lost

Fluid Intake Guidelines

Time in reference to event	**Ounces of fluid (oz.)**
24 hours before	Drink freely
2 hours before	8–16 oz.
15 minutes before	8–16 oz.
During	4 to 8 oz. every 15–20 minutes
After	Drink freely



Ages 6 – 12

Before Sports

Drinking Fluids prior to exercise appears to reduce or delay the detrimental effects of dehydration.

- 1 – 2 hours before sports – 4 to 8 ounces of cold water
- 10 – 15 minutes before sports – 4 to 8 ounces of cold water

During Sports

Every 20 minutes: 5 – 9 ounces of cold water depending upon weight.
(5 for a child weighing 88 pounds, 9 ounces for a child weighing 132 pounds).

After Sports

Post exercise hydration should aim to correct any fluid lost during the practice.

Within 2 hours: at least 24ounces of water for every pound of weight lost.

Ages 13 – 18

Before Sports

Drinking Fluids prior to exercise appears to reduce or delay the detrimental effects of dehydration.

- 1 – 2 hours before sports – 8 to 16 ounces of cold water
- 10 – 15 minutes before sports – 8 to 12 ounces of cold water

During Sports

Every 20 minutes: Between 7 and 11 ounces of water depending upon weight.

After Sports

Post exercise hydration should aim to correct any fluid lost during the practice.

A short guide for football players on good eating and drinking for football

Diet

For the athlete in training and/or for performance is centred on the complex carbohydrates—whole grains and their products, such as pasta, legumes, potatoes and other starchy vegetables—along with some good-quality vegetable and/or animal protein, fruits, and a low-to-moderate fat intake. Athletes, like everyone else, need a well-balanced diet with a high nutrient intake. The increased activity generates the need for a higher amount of calories, protein, and other nutrients than the less active person requires. For weight control or maintenance, we need to vary our calorie intake with our activity level. When the season is over or we take time off or just stop exercising for some reason, we need to change our diet and consume less calories, fats, and proteins.

A high-fat diet is definitely out for athletes. It slows them down and can increase the body fat percentage, something that is taboo for the active athlete. For many of us, the fatty flavour of foods is the more addictive aspect of the diet, and with any lessening of physical activity, the higher-fat foods will clog the blood vessels and increase cholesterol and heart disease risk. Athletes should definitely avoid fried foods, high-fat meals, lunch meats, bacon, ham, and any foods cooked in animal fats. The higher-protein, lower-fat foods such as fish and poultry are better than the red meats. Some nuts and seeds, high in essential oils and protein, can be used as well.

Protein

This is very important for athletes, but the subject of how much and which proteins are best needs a lot of clarification. Protein intake in general should be less of a focus in the diet. Excess protein intake can produce certain minor problems, including clogging of the colon and stress on the kidneys. More protein than is needed for tissue building and its other functions merely gets used for energy or must be eliminated. The complex carbohydrates, though, are used much more efficiently for energy needs or for storage for later use. So, for best efficiency and performance, diet based on complex carbohydrates with adequate, but not excess, protein is ideal.

Athletes (and regular exercisers), however, do need some extra protein with increased activity, but it should be increased in proportion to calories. People who are trying to gain weight, those wanting to build muscle, or those in heavy training do need additional protein, sometimes up to 150–200 grams daily, to stay in positive protein balance, especially when the calorie intake goes up near 3,000 a day. Some protein powders and amino acid formulas can be used to augment the protein balance. Aerobic-type exercises may slightly increase protein needs but not as much as body-building activities. Some extra protein intake, still along with a high-complex-carbohydrate, low-fat diet, will support muscle bulk while maintaining body fat levels. Young athletes need even more good protein foods than adults but should still focus on the complex carbohydrates for proper development. Again, avoid high-protein diets that exclude other important foods, particularly the complex carbohydrates, fruits, and vegetables. For building muscle, it may be better in many cases (especially when extra calories are not needed) to use good-quality supplemental amino acids or protein hydrolysates containing peptides to provide the cells and tissues with what they need to build and repair, rather than eating an excess of heavier flesh food proteins.

Complex Carbohydrates

These provide the sustaining long-term energy, proteins the tissue building, and fats the lubrication and tissue support. This type of diet is also high in fibre, which allows good elimination. It is wise for serious athletes and health-conscious people to avoid excessive use of alcohol, regular cigarette smoking, and stimulants such as caffeine in coffee, tea, and cola beverages. Some iron-rich foods are especially important for female athletes or active runners, as their red blood cells may be broken down more rapidly. High-iron foods include red meats and liver (organic only), shellfish such as oysters, leafy greens, prunes, and mushrooms.

Carbohydrate loading

This is a fairly new concept in the athletic world. It is based on the fact that complex carbohydrates such as grains, pastas, pancakes, and whole grain breads increase available energy, improving the stamina and ability to work. Here is how carbohydrate loading works. Four or five days before an endurance-type event, we increase our exercise and reduce our complex carbohydrate intake to about 40–50 percent of our diet, and eat more protein, fats such as dairy products and eggs, and fruit. This depletes the glycogen in our muscles and liver. Then, two to three days before the event, we increase complex carbohydrates to 70–75 percent of our diet, eating at least three big meals of carbohydrates, plus some proteins and fats. This increases the stored glycogen in the liver and muscles. Glycogen, the storage form of glucose, is easily converted to the simple sugar that is used by all cells and tissues for energy. Glycogen is then burned first for energy; if more energy is needed, fat will be utilized, and that works well too. If there is very low body fat, proteins in tissues may also be converted to energy. All of these macronutrients will need to be replaced. Some athletes report that carbohydrate loading increases sexual energy too. For any athletes with fatigue, carbohydrates will often help. Adding more grains, pasta, cereals, breads, vegetables, and fruit may also add strength and endurance.

General Balanced Diet for Athletes

Carbohydrates—50–60 percent of total calories
- 10–20 percent simple—fruits, most vegetables, and any special "treats"
- 40–50 percent complex—whole grains, legumes, starchy vegetables

Proteins—15–20 percent (maximum 25 percent)
- animal—fish, poultry, meats, eggs, dairy
- vegetable—nuts, seeds, legumes

Fats—25–30 percent
- saturated—meats, eggs, dairy products
- unsaturated (more than half)—nuts, seeds, vegetable oils, avocado

Fluid Intake

One of the biggest nutrient concerns in athletes is water depletion. With heavy training, be it strenuous or extensive activity, large water losses can occur, and drinking water is the only way to remedy this. Long endurance events also increase the need for fluids. Any activity where sweating occurs sets up an even higher requirement for water than the usual one and a half or two quarts per day. Water, which should be our main liquid, has many essential functions. It supports the whole process of sweating and elimination of toxins, it nourishes the skin and other tissues, and it is the medium in which our blood cells circulate and everything in our body lives. Dehydration from low fluid intake leads to weakened tissue perfusion (circulation of blood with oxygen and nutrients), fatigue, and poor performance.

In addition to water, extra minerals must be replaced. These can be added to the water or replaced with food consumed following exercise. Prepared fluid-replacement drinks are good in concept, but many contain chemicals and are overly sweet. For fluid replacement, it is best to avoid sugary drinks or even lots of fruit juices. Diluted fruit juices with minerals would be helpful.

For long events, a little sweet liquid, such as fruit juice, can be added to the water to provide some calories and energy. Water should be drunk in the couple of hours before an event to rehydrate the tissues and then, if there is extended competition or workout, sipped throughout the activity. No colas, caffeine, or alcohol should be consumed prior to or during a race or any exercise. Salt tablets are also best avoided.

Nutrients

Minerals are of major importance, as many are eliminated and need replacement to prevent muscle cramping, reduced cellular support, and other weakened physiological functions. Potassium chloride is lost during exercise through sweat. It is an important electrolyte for nerve conduction and muscle and heart function and is often useful in preventing spasms. Extra potassium, about 100–200 mg., is helpful after periods of exercise, along with potassium-rich foods eaten throughout the day. Calcium and magnesium are also important, a bit more so for women than for men. The calcium-magnesium cellular exchange supports muscle contraction and relaxation, nerve conductivity, cellular and bone strength, and delivery of oxygen to the muscles. From 600–1,000 mg. of calcium and 400-600 mg. of magnesium daily (above the diet) in two portions is suggested. Taking these supplements after exercise and before bed is the minimum. Iron is especially needed by women to maintain the red blood cells' hemoglobin to carry oxygen; iron is also part of the muscle protein myoglobin. Without enough iron, energy and endurance are usually poor, which is not promising for athletic performance. Chromium is also lost in higher amounts during exercise; at least 200 mcg. are needed daily to help prevent or reduce any risk of sugar metabolism problems.

The antioxidant nutrients are important to reduce tissue irritations, inflammations, and loss of energy caused by free radicals. Vitamin A and beta-carotene, vitamin E, selenium, and vitamin C are all part of the athlete's PEP. Loss of vitamin C, essential to connective tissue strength, is also increased with exercise. Joggers need extra C to prevent bone and ligament injuries, and ascorbic acid may be helpful in reducing all kinds of musculoskeletal irritation and injury. The vitamin C-mineral formula I mentioned previously is not only useful for assimilating the vitamin C, but is also an easily absorbable formula that replaces several important minerals. A complete mineral tablet can also be taken with it. Silicon or silica, usually derived from the horsetail herb Equisetum arvense, is important for maintaining elasticity and flexibility in the tissues.

Nutrients and Exercise

- **Water**—essential to cell respiration and circulation
- **Antioxidants (vitamins A, C, and E; selenium, L-cysteine)**—protect against tissue, joint, and cell irritation by reducing free radicals and oxidation of fats
- **Bioflavonoids**—improve vitamin C effectiveness; serve as anti-inflammatory agents.

B Vitamins

- **B1**—generates energy
- **B2**—improves cell oxidation
- **B3**—energy metabolism
- **B5**—adrenal support; boosts energy
- **B6**—enhances performance by metabolism of amino acids and proteins
- **Folic acid and B12**—red blood cell formation; adequate oxygen delivery
- **Biotin**—carbohydrate metabolism; generates energy
- **Choline**—supports brain and nervous system

Minerals

- **Calcium**—bone metabolism; muscle and nerve function
- **Iodine**—thyroid support
- **Iron**—blood cells and oxygen
- **Magnesium**—muscle and nerve function; with potassium, improves endurance
- **Manganese**—tissue strength and cellular function
- **Potassium**—muscle and nerve function; improves endurance
- **Zinc**—improves performance; growth and tissue repair

Amino Acids (all L- forms)

- **Leucine**, isoleucine, valine—muscle energy
- **Carnitine**—fat utilization, energy generating
- **Arginine**—growth hormone; muscle building
- **Lysine**, ornithine—work with arginine
- **Tyrosine**—thyroid hormone and neurotransmitters
- **Tryptophan**—good sleep
- **Phenylalanine**—improves mental performance; may reduce pain of exercise
- **Aspartic acid**—brain support
- **Proline**—tissue support

Others

- **Enzymes (trypsin, bromelin, papain, pancreas, superoxide dismutase)**—reduce inflammation
- **Coenzyme Q10**—supports heart function
- **Octacosanol**—increases stamina, long-term effect
- **Liver**—boosts energy
- **Adrenal, heart, thyroid extract**—individual organ support
- **Dimethylglycine**—improves oxygen utilization
- **Gamma-linolenic acid**—anti-inflammatory
- **Inosine**—energizing through ATP formation
- **Germanium sesquioxide**—energizing through facilitating electron transport

Athlete's Nutrient Program

Calories*	2,000–3,500			
Water*	2–3 1/2 qt.			
Protein*	75–150 g.			
Fats*	60–100 g.			
Vitamin A	5,000–10,000 IUs		**Molybdenum**	500 mcg.
Beta-carotene	15,000–25,000 IUs		**Potassium**	2–3 g.
Vitamin D	400 IUs		**Selenium**	250–400 mcg.
Vitamin E	400–1,000 IUs		**Silicon**	100–200 mg.
Vitamin K	300 mcg.		**Zinc**	women—15–30 mg.
Thiamine (B1)	75 mg.			men—30–60 mg.
Riboflavin (B2)	25–75 mg.		***Optional:***	
Niacin (B3)	50 mg.		**L-amino acids**	1,500 mg.
Niacinamide (B3)	100 mg.		**L-carnitine**	500–1,000 mg.
Pantothenic acid (B5)	1,000 mg.		**L-arginine**	1,000–1,500 mg.
Pyridoxine (B6)	50 mg.		**L-lysine**	1,000–1,500 mg.
Pyridoxal-5-phosphate	100 mg.		**L-proline**	500 mg.
Cobalamin (B12)	100 mcg.		**Branched-chain**	1,000 mg. each
Folic acid	800 mcg.		**amino acids**	(before workouts
Biotin	500 mcg.		**(leucine, isoleucine,**	with 50 mg.
Choline	500 mg.		**valine)**	vitamin B6)
Inositol	500 mg.		**Bromelain**	100–200 mg.
Vitamin C	2–5 g.			(2,000 mcu/g.)
Bioflavonoids	250–500 mg.		**Pancreatic enzymes**	200–400 mg.
			(after meals)	(1–2) tablets
			Lactobacillus	1–2 billion organisms
Calcium	600–1,000 mg.		**Dimethylglycine**	25–50 mg.
Chromium	250–400 mcg.		**(before exercise)**	
Copper	2–3 mg.		**Coenzyme Q10**	30–60 mg.
Iodine	150–250 mcg.		**Flaxseed oil**	2–3 t.
Iron	women—20–25 mg.		**Gamma-linolenic**	
	men—10–15 mg.		**acid (GLA)**	160–400 mg.
Magnesium	400–650 mg.		**Octacosanol**	2–4 capsules
Manganese	5–15 mg.			(250–500 mg.)

*Varies from women to men and with the extent of exercise