

## FAT REQUIREMENTS

Free fatty acids are stored with glycerol as triglycerides, in the body's adipose tissue. The enzyme lipoprotein lipase mobilises these stores of fatty acids. This lipase is stimulated by exercise. Its activity is affected by levels of hormones also implicated in exercise, especially, growth hormone and epinephrine.

It is important to recognise fat as a substance not exogenous from the diet directly but endogenous from body fat stores. Dietary fat is not necessary to maintain fat stores, since excess calories are stored as fat, regardless of their dietary source. It is important to have some fat in the diet, especially a source of the essential fatty acids, since the heart muscle prefers fatty acids especially linoleic acid, as an energy source. Compulsive runners who have virtually eliminated fat from their diets have linoleic acid deficiency. Death may result from cardiac arrest in some cases. Although it is necessary to include some fat in the diet, the total amount should not exceed 20-25 per cent of the total daily caloric intake.

*Source:* Cited from Larson–Meyer Enette, 2007, Vegetarian sports nutrition, Human kinetics.

High rates of fat oxidation can occur during aerobic exercise. Aerobic training increases the ability of the body to use fat as an energy source. Thus for athletes who require high energy intakes, fat is an important fuel and adds to daily energy requirements. Fats must be present in adequate amounts, too less or too much both may have adverse effects. Most athletes eat moderately low fat diet.

Fats may contribute as much as 75 per cent of the energy demand during prolonged aerobic work. Total energy provided in the diet by fat may range from 20-30 per cent including both visible and invisible fat with the ratio of 2 : 1.

Fat is a necessary component of a normal diet, providing energy and essential elements of cell membranes and associated nutrients such as vitamins A, D, and E.

It has been estimated in both men and women that muscle, fat serves as an important source of fat fuel during moderate, 65 percent  $\text{VO}_2$  max and intense exercise 85 per cent  $\text{VO}_2$  max, and is reduced by 20-50 per cent after moderate to strenuous endurance exercise. Endurance training increased the amount of fat stored within muscle and also the use of this fuel during exercise.

Diets that are too high in fat, or even protein for that matter, do not provide sufficient carbohydrate to keep glycogen stores stocked. Diets too high in saturated and *trans* fat, promote cardio vascular disease. Athletes with high energy demands can consume more than 30 per cent fat as long as the sources are low in saturated and *trans* fat.

In athletes, evidence suggests that diets that are too low in fat, diets providing less than 15 per cent fat are associated with dry flaky skin, compromised immune function and increased risk for amenorrhea or altered menstrual cycle function. Low fat diets are also known to raise serum triglycerides even in athletes. Low fat diets may even impair endurance performance by reducing fat storage in muscle.

Dietary fat intake for strength/power athletes should be fairly similar to that normal person. However strength power athletes must maintain a positive energy balance, replenish intramuscular triglyceride stores and support anabolic hormone production. They can tolerate slightly higher dietary fat intake, particularly essential fatty acids than the general population.

Generally it is recommended that strength/power athletes receive approximately 30 per cent of their daily caloric intake from fat with about 10 per cent or fewer of their calories coming from saturated fats. Unlike the general population who are recommended to limit saturated fat intake-the strength/power athlete should consume some saturated fat in his/her diet. Higher fat diets seem to maintain circulating testosterone concentration better than low fat diet. Maintaining optimal testosterone levels is important for this type of athlete for building muscle mass and strength.

Cholesterol may also be important for muscle growth and strength. Cholesterol is important for testosterone production as well as maintaining the integrity of cell membranes.

The majority of the strength/power athlete's dietary fat should come from monounsaturated and polyunsaturated fats. About 10-15 per cent of their daily calories should come from monounsaturated fats and another 10-15 per cent from polyunsaturated fats. These fats promote athletic performance. Mono and poly unsaturated fats help to lower total blood cholesterol and triglycerides and increase high density lipoprotein cholesterol levels in the blood,  $\omega$ -3 polyunsaturated fats also help prevent chronic inflammatory related diseases such as cardiovascular disease. They may improve insulin sensitivity and blood pressure, reducing the risk of diabetes and hypertension. More important to the athlete mono and poly unsaturated fats are more readily burned for fuel than *trans* and saturated fats are. Diets rich in polyunsaturated fats may help spare muscle glycogen and potentially increase the time it takes to reach muscle exhaustion.  $\omega$ -3 fatty acids may prevent muscle and bone loss during times of inactivity.

The strength/power athlete should avoid *trans* fats. *Trans* fats promote heart disease, diabetes, certain cancers and obesity. They also increase low density lipoprotein cholesterol levels, C-reactive protein and triglycerides. *Trans* fats lower high density lipoprotein cholesterol levels and may encourage muscle break down.

For monounsaturated fats, good choices include olive, canola and peanut oils; nuts and avocados. Good sources of polyunsaturated fats include corn, safflower, sesame, canola, soya and sun flower oils; nuts and seeds. The best sources of  $\omega$ -3 polyunsaturated fatty acids come from

MAC  
cold water fish such as herring, mackerel, salmon, sardines and tuna; flaxseed and walnuts. To ensure that he or she receives some saturated fats, the strength/power athlete should eat some meat, poultry and dairy products as well as coconut, palm and palm kernel oils. To avoid transfats these athletes should be encouraged to avoid processed foods such as cookies, crackers and pastries and margarine.