Sporting performance and food

The link between good health and good nutrition is well established. Interest in nutrition and its impact on sporting performance is now a science in itself.

Whether you are a competing athlete, a weekend sports player or a dedicated daily exerciser, the cornerstone to improved performance is a nutritionally adequate diet.

Daily training diet requirements

The basic training diet should be sufficient to:

- Provide enough energy and nutrients to meet the demands of training and exercise
- Enhance adaptation and recovery between training sessions
- Include a wide variety of foods like wholegrain breads and cereals, vegetables (particularly leafy green varieties), fruit, lean meat and low-fat dairy products to enhance long term nutrition habits and behaviours
- Enable the athlete to achieve optimal body weight and body fat levels for performance
- Provide adequate fluids to ensure maximum hydration before, during and after exercise
- Promote the short and long-term health of athletes.

The athlete's diet

An athlete's diet should be similar to that recommended for the general public, with energy intake divided into:

- More than 55 per cent from carbohydrates
- About 12 to 15 per cent from protein
- Less than 30 per cent from fat.

Athletes who exercise strenuously for more than 60 to 90 minutes a day may need to increase the amount of energy they get from carbohydrates to between 65 and 70 per cent.

More recent advice also provides guidelines for carbohydrate and protein based on grams per kilogram (g/kg) of body weight. The current recommendations for fat intake are for most athletes to follow similar recommendations to those given for the general community, with the preference for fats coming from olive oils, nuts, avocado, nuts and seeds. Athletes should also aim to minimise intake of high-fat foods such as biscuits, cakes, pastries, chips and fried foods.

Carbohydrates and exercise

During digestion, all carbohydrates are broken down into glucose, which is the body's primary energy source. Glucose can be converted into glycogen and stored in the liver and muscle tissue. It can then be used as a key energy source during exercise to fuel exercising muscle tissue and other body systems. Athletes can increase their stores of glycogen by regularly eating high-carbohydrate foods.

If carbohydrate in the diet is restricted, a person's ability to exercise is compromised because there is not enough glycogen kept in storage. This can result in a loss of protein (muscle) tissue because the body will start to break down muscle tissue to meet its energy needs and may increase the risk of infections and illness.

Carbohydrates are essential for fuelling and recovery

Current recommendations for carbohydrate requirements vary depending on the duration, frequency and intensity of exercise. Foods rich in unrefined carbohydrates, like wholegrain breads and cereals, should form the basis of the athlete's diet. More refined carbohydrate foods (such as white bread, jams and lollies) are useful to boost the total intake of carbohydrate, particularly for very active individuals.

Athletes are advised to adjust the amount of carbohydrate they consume for fuelling and recovery to suit their exercise level:

- Light intensity exercise (30 mins/day) 3–5g/kg/day
- Moderate intensity exercise (60 mins/day) 5–7g/kg/day
- Endurance exercise (1–3 hrs/day) 7–12g/kg/day
- Extreme endurance exercise (more than 4 hrs/day) 10–12g/kg/day

Glycaemic index

The glycaemic index (GI) ranks food and fluids by how 'carbohydrate-rich' they are and how quickly they affect the body's blood sugar levels. The GI has become of increasing interest to athletes in the area of sports nutrition. More research is required to confirm the best recommendations for sports nutrition; however, there is a suggestion that low GI foods may be useful before exercise to provide a more sustained energy release.

Moderate to high GI foods and fluids may be the most beneficial during exercise and in the early recovery period. However, it is important to remember the type and timing of food eaten should be tailored to individual preferences and to maximise the performance of the particular sport in which the individual is involved.

Pre-event meal

The pre-event meal is an important part of the athlete's pre-exercise preparation. A high-carbohydrate meal three to four hours before exercise is thought to have a positive effect on performance. A small snack one to two hours before exercise may also benefit performance. While some people may experience a negative response to eating close to exercise, it is important to note that this is individual and can be overcome by ensuring an adequate intake of carbohydrate to avoid performance impact.

The pre-event meal should be easily digestible, high-carbohydrate, low-fat, low-fibre and known not to cause gastrointestinal upset. Examples of appropriate pre-exercise meals and snacks include cereal and low-fat milk, toast/muffins/crumpets, fruit salad and yoghurt, pasta with tomato-based sauce, a low-fat breakfast or muesli bar or low-fat creamed rice.

Eating during exercise

During exercise lasting more than 60 minutes, an intake of carbohydrate is required to top up blood glucose levels and delay fatigue. Current recommendations suggest 30-60g of carbohydrate is sufficient and can be in the form of lollies, sports gels, low-fat muesli and sports bars or sandwiches with white bread. It is important to commence intake early in exercise and to consume regular amounts throughout the exercise period. It is also important to consume regular fluid during prolonged exercise to avoid dehydration. Sports drinks, diluted fruit juice and water are suitable choices.

Eating after exercise

Rapid replenishment of glycogen is important following exercise. Carbohydrate foods and fluids should be consumed after exercise, particularly in the first 1-2 hours after exercise. To top up glycogen stores after exercise, eat carbohydrates with a moderate to high GI in the first half hour or so after exercise. This should be continued until the normal meal pattern resumes. Suitable choices to start refuelling include sports drinks, juices, cereal and low-fat milk, low-fat flavoured milk, sandwiches, pasta, muffin/crumpets, fruit and yoghurt.

Protein and exercise

Protein is an important part of a training diet and plays a key role in post-exercise recovery and repair. Protein needs are generally met by following a high-carbohydrate diet, because many foods, especially cereal-based foods, are a combination of carbohydrate and protein.

The amount of protein recommended for sporting people is only slightly higher than that recommended for the general public. For example:

- **General public and active people** – the daily recommended amount of protein is 0.8–-1.0g/kg of body weight (a 60kg person should eat around 45–60g of protein daily).
- **Sports people involved in non-endurance events** – people who exercise daily for 45–60 minutes should consume between 1.0–1.2g/kg of body weight per day.
- **Sports people involved in endurance events and strength events** – people who exercise for longer periods (more than one hour) or who are involved in strength exercise, such as weight lifting, should consume between 1.2–1.7g/kg of protein of body mass.

Dietary surveys have found that most athletic groups comfortably reach and often exceed their protein requirements by consuming a high-energy diet. Despite this, protein and amino acids (the building blocks of protein) are popular nutritional supplements.

Amino acids and supplements

Many people believe that additional protein, or even specific amino acid supplements, will provide extra benefits for athletes involved in intense training. For most people, sufficient amounts of protein can be obtained from a healthy diet.

While more research is required, concerns associated with very high-protein diets include:

- Increased cost
- A potential negative impact on kidney function in susceptible individuals
- A reduction of bone density
- Increased weight if protein choices are high in fat
- A lack of other nutritious foods in the diet such as bread, cereal, fruit and vegetables due to a focus on protein foods.

Vitamin supplements

A well-planned and nutritionally adequate diet should meet an athlete's vitamin and mineral needs. Supplements will only be of any benefit if your diet is inadequate or you have a diagnosed deficiency, such as an iron or calcium deficiency. There is no evidence that mega-doses of vitamins improve sporting performance.

The indiscriminate use of vitamin and mineral supplements is potentially dangerous and they should not be taken without the advice of a qualified health professional. Dietary imbalances should be rectified by analysing and altering the diet, rather than by using a supplement or pill.

Water and exercise

Dehydration can impair athletic performance and, in extreme cases, may lead to collapse and even death. Drinking plenty of fluids before, during and after exercise is very important. Don't wait until you are thirsty. Fluid intake is particularly important for events lasting more than 60 minutes, of high intensity or in warm conditions.

Water is a suitable drink, but sports drinks may be required especially in endurance events or warm climates. Sports drinks contain some sodium, which helps absorption. A sodium content of 30mmol/L (millimoles per litre) appears suitable in sports nutrition.

Using salt tablets to combat muscle cramps is no longer advised. It is lack of water not sodium that affects the muscle tissue. Persistent muscle cramps might be due to zinc or magnesium deficiencies.

Where to get help

- Your doctor
- An Accredited Practising Dietitian, contact the Dietitians Association of Australia.
- Sports Dietitians Australia Tel. (03) 9926 1336

Things to remember

- Good nutrition can enhance sporting performance.
- A well-planned, nutritious diet should meet most of an athlete's vitamin and mineral needs and provide enough protein to promote muscle growth and repair.
- Foods rich in unrefined carbohydrates, like wholegrain breads and cereals, should form the basis of the diet.
- Water is a great choice of fluid for athletes to help performance and prevent dehydration.

This page has been produced in consultation with, and approved by:

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