

# Science in Coaching

---

## Resource: Nutritional Guidelines

Part 1: **Nutritional Guidelines for Health (All Coaching Communities)**

Part 2: **Middle/Late Childhood Coaching Communities**

Part 3: **Early/Late Teenage Coaching Communities**

Part 4: **Social/Competitive Adult Coaching Communities**

This resource covers learning outcome 2 for the Science in Coaching Module.

### **Part 1: Nutritional guidelines for health (All Coaching Communities)**

Healthy nutrition benefits any competitive athlete regardless of age, gender or level of competition. Research reveals that sprint, endurance and strength skills, for example, all benefit from the food that the athlete consumes. Good nutrition will not only benefit competition day. It will quite possibly make the athlete feel and train better and hence is an important consideration for effective day-to-day activity and training. The guidelines that follow are designed to ensure that athletes understand the correct proportions of foods to suit both training and everyday needs.

#### **Basic guidelines**

The points that follow meet the New Zealand guidelines for healthy eating and can be adjusted to suit an athlete's specific sports needs.

#### **4.1 Eat a variety of food**

Eating a variety of food from all the major food groups will give your body all the nutrients it requires.

- 6-11 serves of bread/cereal/rice/pasta – This will give carbohydrates for energy, dietary fibre and a number of vitamins and minerals
- 5+ a day of fruits and vegetables – This will give a boost in vitamins and minerals as well as dietary fibre and carbohydrates.
- 2-3 serves of meat/meat alternatives, dairy/dairy alternatives – This provides our body with protein for building and repair muscles, as well as providing a source for many vitamins (fat soluble) and minerals such as iron.
- Eat minimal amounts of fats/oils and sugar – Although our bodies use fat for insulation and protection, too much can cause fat build up which leads to medical conditions such as, heart disease, cancer and obesity.

#### **4.2 Eat dietary fibre**

Dietary fibre is found in cereals, grains, wholemeal breads, fruits and vegetables. Dietary fibre regulates intestinal function and improves bowel health.

#### **4.3 Limit total fat intake**

Fat is classified as saturated or unsaturated and most foods offer a mixture of both. Saturated fat increases total blood cholesterol, particularly Low Density Lipoproteins (LDL) which promotes build-up on the artery walls, causing heart disease. Saturated fats are found in animal products. To reduce the amount of saturated fat, trim visible fat off meat and choose low fat dairy products. Unsaturated fats are mainly found in plant based products. They are classified as polyunsaturated and provide omega-6 and omega-3 or monounsaturated fat, which has been found to help decrease LDL cholesterol.

#### **4.4 Limit sodium and food high in salt**

High sodium intake is associated with high blood pressure. Most processed foods contain salt so there is no need to add extra salt to food.

#### **4.5 Maintain fluid intake**

6-8 glasses of water a day are required and on days when athletes are engaging in physical activity, at least 2-4 extra glasses are needed. Sugary drinks or drinks high in caffeine should be avoided during exercise as these sorts of drinks are not effective at re-hydrating the body.

#### **Summary**

While athletes can pay careful attention to a refined diet that will benefit performance, the first priority is to have a thorough understanding of basic healthy eating habits that ensure that the body is appropriately nourished on a day to day basis. This brief guide serves to provide coaches with a fundamental understanding of healthy nutrition. It is hoped that the application of this knowledge will benefit athletes in any population who might be eating poorly and thus jeopardising both their health and sports performance.

#### **Examples of Average Serve Sizes**

##### **Vegetables**

- 1 medium potato, kumera, yam or taro (135g)
- ½ cup cooked vegetables e.g. puha, water cress, parengo or corn (50-80g)
- ½ cup salad or mixed vegetables (60g)
- 1 tomato

##### **Fruits**

- 1 apple, pear, or orange (130g)
- 2 small apricots or plums (100g)
- ½ cup fresh fruit salad or stewed fruit (canned, frozen or fresh) (135g)
- 1 cup fruit juice or a serving of dried fruit (only one counts)

##### **Carbohydrate Group: Breads and cereals**

- 1 bread roll (50g)
- 1 muffin (80g)
- 1 medium slice rewena
- 1 medium slice bread (26g)
- 1 cup cornflakes
- ½ cup of muesli
- ½ cup of cooked porridge
- 1 cup cooked pasta or rice (150g)
- 1 cup cassava or tapioca (150g)
- 2 plain sweet biscuits (14g)

##### **Protein Group: Milk and milk products**

- 1 large glass of milk (250mL)
- 1 pottle yoghurt (150g)
- 2 slices of cheese (40g)
- 2 scoops of ice-cream (140g)

##### **Protein Group: Lean meat, chicken, seafood, eggs, cooked dried beans, peas, lentils**

- 2 slices cooked meat (100g)
- ¾ cup mince or casserole (195g)
- 1 egg (50g)
- 1 medium fillet of fish cooked (100g)
- 1 medium steak (120g)
- ¾ cup of dried cooked beans (135g)
- 2 drumsticks or 1 chicken leg (110g)

#### **References**

- Inge, Karen (2001). Sports Nutrition, in Frank S. Pyke (Ed.). *Better Coaching – Advanced Coach's Manual* (pp. 181-189). Human Kinetics: Lower Mitcham.
- NZ Academy of Sport Nutrition Fact Sheet (Carbohydrate)
- NZ Academy of Sport Nutrition Fact Sheet (Protein)

## **Part 2: Nutritional Guidelines for Middle/Late Childhood Coaching Communities**

Children have very different dietary needs than adults. Appropriate nutrition during the younger years is essential for growth, maintenance and good health through the developing years. Children in New Zealand come from many different ethnic, religious, and socioeconomic groups which may lead to different belief systems about food and nutrition.

Being aware of child nutrition and particularly its affect on sport and the extra demands it places on each child can help, not only with growth and development, but also better sporting performance. The guidelines in New Zealand recommend that healthy children should:

- Eat many different foods
- Eat enough for activity and growth
- Eat mini-meals or snacks
- Have plenty to drink
- Have treat foods now and then
- Take part in regular physical activity.

### **Energy Requirements**

Young children grow rapidly and are very active. Their energy needs, relative to their body size and limited stomach capacity, are very high. They need frequent meals of good quality sources of energy. Recommendations for energy intake must take into account the level of activity, age, gender, weight and height. Therefore, the recommended daily intake (RDI) of 6-8MJ/day should be used purely as a guide. An energy intake of 6-8MJ/day requires three meals and two snacks a day. Meals are typically not large.

### **Protein**

Protein is important for the growth, development and repair of body tissues. Adequate amounts of protein will enable faster recovery from exercise and injury.

Protein can be found in dairy and dairy alternatives, such as: milk, cheese, yoghurt, soy milk, soy cheese, meat, poultry, fish, eggs, nuts, seeds, tofu etc.

Protein requirements should be 18-24 grams per day or 1gram per kilogram of body weight per day.

### **Fat**

Fat is an important source of energy, as it provides essential fatty acids, fat soluble vitamins (which play a role in cell structure) and has a role in the endocrine and immune systems.

Fats can be categorised as:

- Saturated – found in animal products, such as: beef, chicken, dairy, egg yolks.
- Polyunsaturated – found in plant oils, such as: peanut, safflower, soy bean, margarine.
- Monounsaturated – found in olives, peanuts, avocado, almonds.
- Essential fats – Omega 3 and omega 6 fatty acids cannot be produced by the body and play a role in brain and retinal visual function. Omega 3 is found in leafy vegetables, vegetable oils, fish and sea food while omega 6 is found in vegetable oils and meat.

### **Carbohydrate**

Our body uses carbohydrates as its main source of energy. Carbohydrates come from foods such as; bread, rice, cereal, pasta, corn, potatoes, bananas and sugar. The carbohydrates are converted to blood glucose which is subsequently distributed to working muscle as energy. Foods like long grain rice, pasta and grainy bread provide muscle with a steady supply of energy, whereas foods that are high in sugar or are highly processed only supply a rapid form of energy. Therefore, as a coach, it is best to encourage young athletes consume foods that supply the type of carbohydrates that are steadily absorbed.

## Dietary Fibre

Dietary fibre refers is only found in plant products and has a digestible and an indigestible component. Dietary fibre has been linked to decreasing the risk of a large number of diseases, such as colon cancer and heart disease. Many studies looking at dietary fibre in diets refer to adults, very little is done on children. There is no RDI for dietary fibre in children and it is not recommended that children have high-fibre diets. The bulkiness of high-fibre foods makes children feel fuller which makes it difficult for them to eat sufficient amounts to meet energy requirements. Rather than worry about appropriate amounts of dietary fibre, children should be encouraged to meet the serving recommendation of fruits, vegetables, breads and cereals in the food and nutrition guidelines.

## Iron

Children grow rapidly and as a result iron needs are greatest during growth stages in childhood. Iron is present in food in two forms, haem iron or non-haem iron. Haem iron is found in animal tissues, such as meat, fish and poultry and is absorbed easily by the body. Non-haem iron is found in plant sources such as cereals, vegetables, nuts, legumes and fruits and is not absorbed as well. Often it is a good idea to have non-haem iron sources with vitamin C to help absorption. Iron supplementation should only be given if there is evidence of deficiency. RDI for children is 6-8g/day.

## Folate

Folate is important for growth and formation of proteins in the body. Good sources are found in dark green and leafy vegetables, such as broccoli, lettuce, spinach and cabbage. Children who have a balanced diet from all four food groups should get adequate amounts of folate.

## Fluids

Drinking fluids, in particular water, is vital for hydration and maintaining body temperature. Children can't regulate body temperature as well as adults do, which makes it vital for them to stay hydrated, especially during exercise and in hot conditions. Children should be offered sweet drinks after or during exercise to help maintain glucose levels.

## Treat foods

High fat, sugar and salt foods should be limited to every now and again, not everyday. Fast foods and junk foods often lack nutritional value and high consumption can lead to childhood obesity or other diseases later in life. Children should be encouraged to make good snack choices.

## The Healthy Food Pyramid

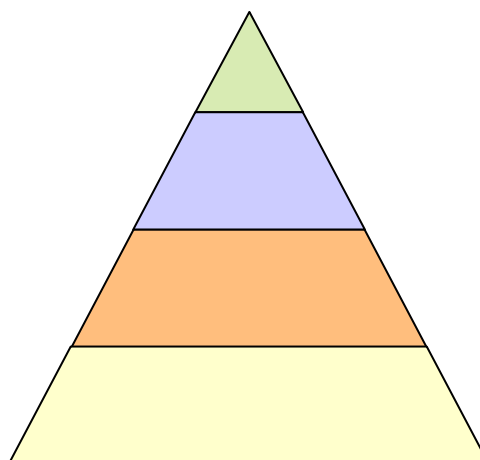
**Eat Least:** Fats, oils, sugar, lollies

**Eat Moderately:** Milk, yoghurt, cheese, ice-cream, cottage cheese, soy milk, meat, chicken, fish, eats, nuts.

**Eat Most:** Fruit and vegetables.

**Eat Most:** Bread, rolls, cornflakes, Weet-Bix, Muesli, porridge, cooked rice or pasta, potato

**Drink Most:** Water.



***Eat 6 – 11 serves a day***

Carbohydrates provide energy. Active muscle uses carbohydrates like a car uses fuel. Without fuel the car can't travel very far. Eating 6-11 serves of foods such as bread, cereal, rice & pasta give muscles the fuel to go all day. The brain also uses carbohydrates to think and focus. Favourite foods may be: spaghetti, popcorn, sandwiches, noodles etc.

***Eat 5+ a day***

Fruits and vegetables contain vitamins and minerals to help us fight illness like colds and flu. They help our eyes to adjust from dark to light, help cuts and bruises to heal faster, keep our hearts healthy and help grow healthy bones. The more variety we have the more vitamins and minerals we get. Not only are fruits and vegetables good for you they make a tasty snack!

***Eat 2-3 serves a day***

Dairy and dairy alternatives like milk, yoghurt, cheese and soy products provide our body with many vitamins and minerals. One of the most important minerals is calcium which helps grow strong bones and teeth.

Meat and meat alternatives like mince, chicken, ham, fish, eggs, nuts, seeds, tofu and soy mince provide our body with protein to help growth and repair of tissue.

***Eat sparingly***

Fats, oils and sweets like sugar, chocolate, chips and lollies, taste really good to our taste buds but they are not very good for our insides. They can cause cavities in our teeth. It is ok to have them sometimes as a treat, but not all of the time.

**Summary for Middle/Late Childhood Coaching Communities**

The childhood years are critical in providing the experiences that encourage athletes to stay involved in sport throughout their lifetime. Good habits, including those relating to nutrition, are formed at this age. Nutrient needs for middle/late childhood athletes are quite different from teenagers and adults as (pre puberty) this is a period steady physical and psychological change. Appropriate nutrition, emphasising good health, is essential for maintenance and growth of tissue which maximise athlete's ability to participate and perform in a range of activities. Good health at this stage of an athlete's life will set up good habits into teenage years and beyond.

## Part 3: Nutritional Guidelines for Early/Late Teenage Coaching Communities

This resource is designed to address a number of nutritional issues that are relevant to teenagers who participate in sport. It examines energy needs and covers the different food types such as carbohydrates, protein, fats, vitamins and minerals. It examines how eating can become disordered and strategies to avoid that type of behaviour creeping in. It also examines fluid intake and alcohol consumption.

### Energy

Energy is formed from the overall food intake per day. Active teenagers need energy from all food sources, and each food group has its own function. Energy is measured in kilojoules (kJ) or calories (Cal). The body uses energy for:

- Playing sport, running, jumping, walking or sitting.
- Heart beat
- Breathing
- Growth
- Sleeping

In fact everything an active teenager does requires energy in the form of kilojoules or calories it. For a young male aged 12-15 years, the daily needs are 9200-11800 kilojoules and for females 8100-9800 kilojoules. For young males aged 16-18 years, the energy requirements are between 11700 – 13500 kilojoules per day and females 8800-10000 kilojoules per day. To supply adequate energy requires eating three meals per day with two to three snacks in between.

### Carbohydrates

Carbohydrates come from foods such as; bread, rice, cereal, pasta, corn, potatoes, bananas and sugar. The carbohydrates are converted to blood glucose which is subsequently distributed to working muscle as energy. Foods like long grain rice, pasta and grainy bread provide muscle with a steady supply of energy, whereas foods that are high in sugar or highly processed only supply a rapid form of energy. Therefore, as a coach it is best to encourage the adolescent athlete to consume foods that supply the type of carbohydrates that are steadily absorbed.

#### **10 simple ways to increase consumption of steadily absorbed carbohydrates**

1. The best way is to include one steadily absorbed carbohydrate food at each meal.
2. Switch to breakfast cereals based on barley, oats (such as porridge), wheat and rice bran.
3. Eat grainy breads with whole seeds/grains, and pumpnickel instead of white or brown bread.
4. Eat wheat-based pasta/long-grain rice in place of potatoes/short grained rice, watch serving size.
5. Use fat-reduced milk and low-fat yoghurt.
6. Eat pulses and legumes (such as beans, lentils and peas).
7. Eat sweet corn and taro in preference to other starchy vegetables.
8. Favour apples, dried apricots, cherries, grapefruit, grapes, orange, peaches, pears, plums and under-ripe bananas in preference to other fruits and raisins.
9. Favour less processed foods and foods that aren't over cooked, as processing and cooking makes food easier to digest.
10. Eat fibre because it helps slow the digestion and absorption of carbohydrates.

Rapidly absorbed carbohydrates can be useful for after training or competition to supply carbohydrate rapidly to the recovering muscles. At this time it might be useful to encourage carbohydrate foods such as creamed rice, ripe bananas, fruit juice, sports drinks, honey or jam sandwiches of white bread, tinned fruit and yoghurt.

### Protein

Protein builds up, maintains and replaces tissue in muscle, organs and the immune system. Protein is especially important during adolescence as it helps with hormone production and recovery from exercise. The recommended amount of protein daily should be 1-2 grams per kilogram of body weight, depending on type of activity. Active adolescents need more protein than inactive adolescents, but in general New Zealand teenagers do appear to obtain enough extra protein as required. The athletes that may suffer a poor protein diet include ballerinas, weight class athletes (including those attempting to make a lower weight division) or those dieting for appearance sake.



## **Fat**

Fat is often touted as something athletes should not eat. However, the body needs a certain amount of fat for brain development, hormone regulation, insulation for organs, and sometimes energy. Coaches and athletes are becoming increasingly aware of the foods that contain fat. More than ever, we have low fat and reduced fat food products available, making it easier for athletes to adopt a low-moderate fat diet. There is no doubt that too much fat in the diet increases the risk of excess weight. Fats are energy dense (37kJ/g), compared to protein (17kJ/g) and carbohydrates (16kJ/g). Alcohol is also quite energy dense at 29kJ/g. Dietary fat eaten is stored very efficiently in the body compared with either protein or carbohydrate. Therefore, reducing dietary fat is an easy way to promote healthy eating habits and an optimal power to weight ratio, important in many sports. More importantly, active teenagers should be careful to limit, not only the amount, but also the type of fat eaten.

There are two types of fats; saturated and unsaturated. Saturated fats are found in meat and animal products like butter, milk and cheese, providing vitamins (A, D, E and K) but this type of fat should be limited because it can, over time, lead to heart disease or other health consequences. Unsaturated fat comes from plants and plant products like peanuts, seeds and oils. This fat supports good health by providing vitamins and omega 6 and 3 fatty acids.

## **Vitamins and Minerals**

Vitamins and minerals are vital in helping an active body grow, develop and stay healthy. Athletes need to consume foods containing vitamins because the body can't make them. For this reason, a variety of food is beneficial because it provides a mix of vitamins. Vitamins assist in: fighting infection and illness, recovery from exercise, eyesight, alertness, oxygen transport and building bone and skin. Vitamins are capable of so many things but it should be stressed that vitamins are needed in optimal amounts. Signs of deficiency result if too few vitamins are consumed, just as toxicity signs result if too much is consumed. Teenage athletes who experiment with their diet sometimes supplement a poor diet with large amounts of vitamins. Food contains many nutrients that supplements do not have, so it is best if athletes focus on eating well.

Minerals also help our body in many ways. Examples of minerals in the body are sodium, zinc, calcium, iron and selenium. The two most important during adolescence are calcium and iron. Calcium is vital for bone growth and development and adolescents need greater amounts than children and adults. Males aged 12-15 years have calcium needs daily of 1200 milligrams, which equates to 2 glasses of milk, cereal (with calcium added), 2 slices of cheese, 1 pottle of yoghurt and 1 cup of broccoli. Females aged 12-15 years need 1000 milligrams daily, which equates to 1 glass of milk, cereal (with calcium added), 2 slices of cheese, 1 pottle of yoghurt and 1 cup of broccoli. Males aged 16-18 years need 1000 milligrams daily and females aged 16-18 need 800 milligrams per day.

## **Disordered Eating**

Disordered eating is a lack of food consumption causing a nutrient and energy deficiency leading to malnutrition, menstruation problems, anorexia and bulimia. The condition appears to manifest in certain susceptible individuals who resist change and prefer controlling behaviours. It is a complex condition and links to both psychology and nutrition. As a coach, an understanding and identification of the condition in teenage athletes is useful. However, referral onwards to specialised practitioners is warranted. Eating is a fact of life and something that can be highly controlled, but it should not be at ALL times. The hard truth is if an athlete doesn't eat, they will become unwell. Signs of an eating disorder include large and rapid weight loss, failure to gain weight, avoidance of the issue when it is discussed, withdrawn behaviours, irritability and poor mood state. A coach may not feel comfortable raising the subject of food and weight with an athlete. However, a coach may be able to approach a fellow coach, athlete, psychologist or nutritionist to assist with broaching the subject with an athlete.

A teenager needs to consume enough food from healthy food sources to grow and develop. This is especially true during the adolescent stage of life. There is often a lot of pressure put on teens to look good and more pressure not to appear overweight. But limiting food intake and skipping meals makes dealing with emotion and hormone regulation difficult not to mention the damage to a growing body. New Zealand has as many as 20% of females between the ages of 11-25 years possibly at risk of an eating disorder. It is 15 times more likely that an eating disorder will develop in females than males.

### **Practical advice**

- Don't skip meals (especially breakfast).
- Choose healthy snacks low in fat like: baked bars, fruit, crackers and low fat cheese (Try fruit smoothies, as they combine protein and fruit groups).
- Limit intake of caffeine.
- Limit takeaways to once a week.
- Eat a variety of food.
- Drink plenty of water.
- Choose low fat dairy products.

### **Fluid Intake**

It is difficult to set a general requirement of fluid intake in teenagers, as some are very active, experience large fluid losses and drink very little fluid. However, a minimal fluid intake of 6 to 8 glasses is necessary to off-set losses experienced by insensible sweat (invisible sweat that occurs daily) and to assist the kidneys in excreting waste product from the body. A loss of as little as 2 to 3 percent body water could result in exhaustion and dehydration, or less dramatically, cause a person to become tired and less effective during activity. Guidelines for the prevention of heat stress in children and adolescents have been devised by the Australian Sports Medicine Federation who recommends 300-400 mL of fluid 45 minutes prior to activity and 150-200 mL each 15-20 minutes during activity. Thirst is not a reliable indicator of dehydration.

Carbonated sports and energy drinks are often favoured by teenagers and reinforced through sponsorship of high rating television programmes and endorsement by sporting celebrities. Although soft drinks provide much needed fluid, they are usually high in sugar and as such can depress appetite and substitute for milk, therefore having a negative effect on the intake of magnesium, riboflavin, vitamin A and calcium. The popularity of energy drinks such as Red Bull, V and Lift Plus is a concern, as these drinks have high caffeine contents and are targeted at teenagers. Fortunately, there is little direct evidence that sugar in soft drinks contributes to dental cavities. However, phosphoric acid (primarily found in cola drinks and listed on a food label as food acid (338)), if taken in excess, is very likely to damage teeth by eroding enamel and may reduce the availability of calcium.

### **Drink alcohol in moderation**

Excessive drinking has been linked to being a contributor to ill health long term.

- Drink a glass of water to every alcoholic drink.
- Eat plenty of food.
- Do not consume alcohol immediately after exercise, make sure you have recovered and had a meal.
- Do not consume alcohol if you are injured as this will only slow the healing process.

### **Summary for Early/Late Teenager Coaching Communities**

Teenage athletes have many conflicting pressures to deal with and support is needed to encourage them to stay healthy and remain in sport. Teenagers are our future elite athletes. At this age, nutrient needs are quite different from children and adults as this is a period of significant change for the athletes, both physically and psychologically. Appropriate nutrition, emphasising good health, helps maximise athletic performance. Good health at this stage of an athlete's life will continue to reinforce good habits into adulthood and beyond.



## Part 4: Nutritional Guidelines for Social/Competitive Coaching Community

An athlete's daily intake of food (diet) has to be adjusted according to the stage of the season and therefore, the level of energy demanded by activation of the muscle groups. The nutrients that provide the energy include carbohydrates, protein and fat. Any additional energy demands must be satisfied by the appropriate source of fuel, the two major fuels for exercise being carbohydrates and fat.

### Carbohydrates and the Glycaemic Index

Carbohydrates are a major source of energy in general and especially for sports performance. It is the most readily available source of energy for the muscles where it is stored as glycogen. Depletion of muscle glycogen is thought to be a major cause of fatigue.

Glycaemic Index (GI) is a rating given to food based on their immediate effect on blood glucose levels. It refers to the carbohydrate content in food; the higher the GI the quicker that food is converted to blood glucose. If a food has a high GI then it is absorbed quickly rather than having a sustained release of glucose. Lower GI foods provide a more sustained glucose release.

- Immediately after training or competition a high GI snack will replenish muscle glycogen quickly. For example, jelly beans, sports drinks, potatoes, rice, lucozade, waffles and watermelon.
- Prior to training or competition lower GI foods will give a sustained release of glucose. For example, yoghurt, pasta, milk, chocolate, kiwi fruit, apples, peaches, pears, kumara, soy beans, peas, carrots, sponge cake.

Carbohydrate requirements should be individualised, based on level of activity and body weight:

<b>Activity factor</b>	<b>Requirements</b>
No physical activity	4.5g/kg of body weight
Light to moderate 5 times a week	5g/kg of body weight
1 hour daily or many hours low intensity	5-7g/kg of body weight
1.5 – 2.5 hours moderate to high intensity	7-10g/kg of body weight
Carbo loading (carbohydrate loading)	10g/kg of body weight
Ultra endurance (>4-5 hours/day)	10-12g/kg of body weight

### Protein

Proteins are diverse and have many functions, the main functions being growth of new tissue, maintenance and repair, regulation of hormones and antibodies.

Just like carbohydrates, the daily intake, should be individualised and based on the type of activity:

<b>Activity factor</b>	<b>Requirements</b>
General activity	1g/kg of body weight
Strength training	1.2-1.7g/kg of body weight
Endurance training	1.2-1.6g/kg of body weight
Young athlete (teen)	2g/kg of body weight

Proteins come from two major sources. Firstly, animal foods such as meat, eggs, poultry, fish and dairy produce that contain all the essential amino acids. The second source is plant foods such as nuts, legumes, cereals, beans and lentils. These latter sources often lack specific amino acids which means that vegetarian athletes need to ensure that they eat an adequate variety of plant foods to cover all amino acids.

### Fat

Fat is an important energy source and it contributes to hormone production, cell structure, and provides fat soluble vitamins, A, D, E, K and essential fatty acids. While the body needs a certain amount of unsaturated fat, most diets in the western world include more saturated fat than is necessary. For athletes, a large amount of unsaturated fat can lead to increased body weight which can be impede performance. Athletes should consume between 20-30% of their energy requirements through fat intake, preferably from unsaturated sources such as nuts, seeds, fish and whole grains.

## Body Composition

Body composition refers to the distribution of muscle and fat in the body. As stated, excess fat in sport may affect performance and hinders muscle force production, while conversely, too little will also hinder performance and may lead to disordered eating or nutrition deficiency. What are the norms of body fat as a percentage of body weight?

	General Population (%)		Athletes (%)	
	Males	Females	Males	Females
Lean	<12	<17	<7	<12
Acceptable	12-21	17-28	7-15	12-25
Moderately overweight	21-26	28-33		
Overweight	>26	>33	>15	>25

There are many techniques to assessing body composition a few of which are:

**Hydrostatic weighing** – The most accurate measure but very expensive, requiring specialist equipment and formulae. It maybe uncomfortable as the athlete needs to be underwater.

**DEXA** (Duel energy X-ray) – Expensive and requires specialised equipment. This technology measures the whole body composition.

**Bio impedance** – This measure can be in the form of scales or an easily accessible device. This technique gives an indication of body composition, is easy and equipment required is portable.

**Skin folds** – This technique estimates surface body fat and it is only as accurate as the person doing the measuring, so can be unreliable if poorly done. It is suggested that multiple measures are taken to help reduce inaccuracies. The process requires less equipment and is relatively inexpensive.

Body fat can be reduced by:

- Reducing one's daily overall energy intake.
- Reducing specifically one's intake of dietary fat

## Eating disorders

Athletes often reveal the personality traits that can make them prone to eating disorders. These traits include, perfectionism, high achievement drive, high levels of dedication often with a narrow focus. The nature of their competition may place significant stress on optimal body weight including low body fat for performance. Inge (2001) points to the "female athlete triad", clinical disorders that include eating disorders, menstrual disturbances and reduced bone density. The triad is a complex issue and athletes may suffer from one or more of these disorders. They are not restricted to female athletes as males can suffer from two of the disorders.

The first of two major eating disorders is *anorexia nervosa* and according to this author, the coach can keep a look out for signs that include:

- Sharp weight loss
- Preoccupation with food, weight, fat and calories
- Relentless, excessive exercise
- Mood swings
- Avoiding food-related activities
- Wearing loose clothes (cover weight loss)
- Strange eating habits (odd combinations)

A second disorder is *bulimia nervosa* and the coach should be on the look out for:

- Significant weight loss or gain
- Undue concern about weight
- Visiting the bathroom after meals
- Depressed mood states
- Excessive behaviour regarding diet and weight followed by binge eating

The sooner a coach can detect this behaviour the sooner he or she can institute an intervention by drawing on the expertise of a specialist. Treatment is complex and it demands effective teamwork involving a psychologist or psychiatrist, sports physician, sport dietician and the coach.

## **Supplementation**

Supplements are designed to make up for a diet which is nutrient deficient. Most supplements contain nutrient amounts which exceed required daily intakes (RDI's). It is important for any competitive athlete to seek advice before taking any supplement as he or she may not need it or it may contain banned substances. A balanced diet is always preferable to reliance on supplements.

## **Travelling**

Travel can pose problems regarding access to healthy food or athletes being prone to illness when eating foreign foods. Athletes who are preparing for weight category sports may limit food intake. This may be complicated further by travel.

Further problems that may arise with travelling include:

- Food availability – Always carry snacks & bottled water
- Fatigue
- Dehydration
- Boredom that may cause athletes to eat more
- Eating inappropriate foods
- Gastrointestinal problems
- Food safety

Coaches need to consider factors that are likely to apply to their circumstances. The management team should have athletes apply appropriate strategies to take responsibility for their own nutritional habits when travelling. Athletes need to be educated to minimise the specific risks involved in the given environment.

Healthy eating habits should be the norm and not a practice resorted to for the first time when a team travels. The management team always plan ahead with regard to meals, snacks, accommodation and facilities. When travelling by plane, ensure the airline is aware of dietary needs and make sure extra water is available.

## **Fluid Intake**

It is difficult to set a general requirement of fluid intake as some people who are very active, experience large losses and drink very little fluid. However, a minimal fluid intake of 6 to 8 glasses is necessary to off-set losses experienced by insensible sweat (invisible sweat that occurs daily) and to assist the kidneys in excreting waste product from the body. A loss of as little as 2 to 3 percent body water could result in exhaustion and dehydration, or less dramatically, cause a person to become tired and less effective during activity. Thirst is not a reliable indicator of dehydration.

## **Drink alcohol in moderation**

Excessive drinking has been linked to being a contributor to ill health long term. It not only impairs mind and body while drinking, but also up to 2 days after. It slows injury recovery and slows re-hydration after exercise.

- Drink a glass of water to every alcoholic drink.
- Eat plenty of food.
- Do not consume alcohol immediately after exercise. Make sure you have recovered and had a meal.
- Do not consume alcohol if you are injured as this will only slow the healing process down.

# Macronutrient Content in Common Foods

## Carbohydrate Foods

### *EACH OF THE FOLLOWING FOODS CONTRIBUTES 50G CARBOHYDRATE*

#### Bread and Baked Products

5 thin slices of bread  
1½ Uncle Toby's Fruitbreak  
1½ Bagel  
3 Pancakes  
2½ scones/muffins  
1½ Mother Earth Fruit bars  
2 pita breads  
5 plain digestive biscuits  
2½ English muffins  
5 Salada crackers  
2½ slices thick bread  
2½ Fruity bix bars  
5 rice cakes  
1 long roll

#### Breakfast Cereals and Grains

2½ cups cooked porridge  
2½ cups cornflakes, Special K, Rice Bubbles  
5 Weetbix, Bran-Bix, Vita-Brits  
¾ -1 cup muesli  
1½ cups cooked pasta  
1½ cups cooked rice  
5 cups plain popcorn

#### Vegetables

1¾ cups corn  
2½ cups mixed veges/beetroot

2½ medium potatoes  
1 cup (230g) kumara

#### Dairy Products

1 litre plain milk  
2½ cups flavoured milk  
5 scoops ice cream  
500ml fruit yoghurt

#### Fruit

2 large bananas  
3 medium apples/oranges/pears  
5 large apricots/kiwifruit  
45 grapes  
30 strawberries  
4½ tablespoons sultanas  
15 dates/prunes  
2½ cups canned fruit  
5½ cups watermelon  
2½ thick pineapple slices

#### Confectionery and Drinks

2½ tablespoons jam/honey/sugar  
500ml unsweetened fruit juice, cordial, soft drink  
600ml sports drink (1 bottle)  
27 jellybeans (handful)  
3½ iceblocks  
1½ Leppin squeezies

### *20G PORTION/SERVING OF CARBOHYDRATE*

#### Bread and Baked Products

1 slice thick bread  
5 cream crackers  
2 slices thin bread  
5 Ryvita biscuits  
½ long roll  
2 Salada biscuits  
½ pita bread  
½ fruit bun  
½ Mother Earth cereal bar  
½ bagel  
1 crumpet or English muffin  
1 scone/muffin  
1 Fruity Bix/Sustain/Just Right Cereal bar  
1 tortilla

#### Breakfast Cereals and Grains

1 cup – cornflakes, branflakes, Rice Bubbles  
2 Weetbix/Vitabrits biscuits  
1 cup cooked porridge  
1½ cups All Bran  
⅓ -½ cup muesli  
½ cup cooked pasta/noodles  
½ cup cooked rice

#### Vegetables

1 cup soya beans  
½ cup yams  
½ cup lentils  
1¼ cups peas

1¼ cups mixed vegetables/beetroot  
1 cup pumpkin  
½ -¾ cup kidney, haricot, baked beans or chickpeas

#### Fruit

1 medium banana  
2 large apricots/kiwifruit  
1 apple/pear/peach/orange  
12 strawberries  
20 grapes/cherries  
1 cup stewed/canned fruit  
6 dates/prunes  
2 tablespoons sultanas/raisins  
8 dried apricot halves  
1 thick slice of pineapple  
2½ cups watermelon

#### Dairy Products

400ml plain milk/1 cup flavoured milk  
300ml plain yoghurt  
2 scoops ice-cream/frozen yoghurt  
200ml fruit yoghurt

#### Confectionery and Drinks

1 cup sports drink (250ml)  
10 jellybeans  
2 tablespoons Milo  
½ Leppin squeezie  
200ml unsweetened fruit juice, cordial, softdrink  
1 ice block  
1 tablespoon honey/jam/syrup

## Protein Foods

### EACH OF THE FOLLOWING FOODS CONTRIBUTE MORE THAN 20G OF PROTEIN PER SERVE

Meat – lean (100g cooked)	Chicken – lean (100g cooked)	KFC Zinger Burger (1)
Mussels (12 boiled)	Turkey – lean (100g cooked)	KFC Chicken (2 pieces)
Fish (100g cooked)	Hamburger (medium eg Big Mac)	McDonalds McFeast (1)
Fish – tinned (100g)		
Kidney or liver (100g cooked)	KFC Chicken Fillet Burger (1)	

### EACH OF THE FOLLOWING FOODS CONTRIBUTE 10-20G OF PROTEIN PER SERVE

Crab meat (100g cooked)	Oysters (6 raw)	Fish in batter (160g)
Sausage (100g)	Scallops (6 steamed)	Chicken and almonds (1 cup)
McDonalds Fillet o' Fish (1)	McDonalds Chicken Nuggets (6)	Sweet and sour pork (1 cup)
Raw muesli (80g)	Pizza (1 slice)	McDonalds' Cheeseburger (1)
Hamburger (sml)	Meat pie (average 170g)	Chiko Roll (160g)

### EACH OF THE FOLLOWING CONTAIN 5-10G OF PROTEIN PER SERVE

Yoghurt – non fat (1 pottle 150g)	Reduced fat milk (1 glass 200ml)	Toasted muesli (80g average serve)
Whole milk (1 glass 200ml)	Skim milk powder (2T 16g)	Rice – fried (1 cup 150g)
Flavoured milk (1 glass 200ml)	Goats milk (1 glass 200ml)	Pasta – boiled (1 cup)
So Good (1 glass 200ml)	Salami (30g)	Baked beans (½ cup)
Milkshake (1 glass 200ml)	1 egg (1 average 50g)	Beans (all types) (⅓ cup)
Ham-tinned/cured (1 slice 30g)	Trim milk (1 glass 200ml)	Peanut butter (1T 17g)
Sausage roll (1 medium)	Soy drink (1 glass 200ml)	Bagel (1 average)
Whole milk powder (2T 16g)	Tofu (100g)	All Bran (45g)
Cheddar cheese (30g)	Bread roll (large 100g)	Nutragrain (30g)
Yoghurt – Flavoured (1 pottle 150g)	Scone (1 medium 50g)	English muffin (1 60g)
		Avocado (½ medium)

### EACH OF THE FOLLOWING FOODS CONTAIN LESS THAN 5G OF PROTEIN PER SERVE

Ice-cream (1 scoop 50g)	Tahini (1T 9g)	Fruit loaf (1 slice 30g)
Cottage cheese (2T)	Picnic Bar (45g)	Vitabrits (1 biscuit)
Fetta cheese (30g)	Mars Bar (65g)	Potato – mashed with milk (¾ cup)
Processed cheese (1 slice)	Cheezels, Twisties (25g)	Just Right (30g)
Egg yolk (from 1 egg)	Cream soup (250ml)	Banana (1 medium 120g)
Luncheon meats (30g)	Chicken/Meat/Seafood soup (250ml)	Peanuts (10 nuts 18g)
Bread (1 slice 30g)	Ryvita (2 biscuits)	Brazil nuts (5 nuts 20g)
Vegemite (1 tsp)	Plain sweet biscuits (1 biscuit)	Sesame seeds (1T 10-15g)
Crumpet (1 average 30g)	Cream/Chocolate Biscuits (1 biscuit)	Pumpkin seeds (1T 10g)
Weetbix (1 biscuit)	Milo/Ovaltine (1T)	Potato crisps (25g)
Rice – steamed (1 cup 150g)	Quik Powder (1T)	Tomato/Vege soup (250ml)
Potato (1 medium)	Honey (1T)	KFC Mashed Potato and Gravy (1 serve)
Peas – boiled (⅓ cup 60g)	Jam (1T)	Crispbread (1 biscuit)
Corn – boiled (½ cup 70g)	Sultana Bran (30g)	Cocoa powder (2tsp)
Fruit (1 serve)	Cornflakes (30g)	Milk chocolate Bar (50g)
Fruit – tinned (½ cup)	Mini Wheats (30g)	Sugar (1 tsp)
Apricots – dried (5-6 pieces)	Rice Bubbles (30g)	Marmalade (1T)
Sultanas/Raisins (2T 30g)	Light and Tasty (30g)	Fruity Bix (40g)
Cashews (18 nuts 20g)	Ricotta cheese (2T)	Potato fries (1 cup)
Almonds (10 nuts 20g)	Egg white (from 1 egg)	
Nuts (1T 10g)	Pate (1T 20g)	
Sunflower seeds (1T 15g)		
Pinenuts (1T 9g)		