

## Diet

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Thanks to Clive Brewer - [www.scrum.com](http://www.scrum.com) for much of the information in this section.



*Clive Brewer*

### **Profile: Clive Brewer MSc, BSc (Hons), CSCS**

Clive Brewer is a sports scientist who specialises in the performance preparation of elite sportspersons. Educated at Brunel (BSc Hons. Sports Science) and Loughborough Universities (MSc Sports Science), Clive was formerly the Project Co-ordinator for the Sports Council / Rugby Football Union (England) Fitness Advisory Project. He is currently based at the [Division of Human and Exercise Science at South Bank University](http://www.sas.sbu.ac.uk/) (<http://www.sas.sbu.ac.uk/>) and lectures in the application of sports science for performance improvement and coaching. Clive also works as the fitness advisor to Oxford University Rugby Football Club, the London and the south-east region of the Rugby Football Union, and a number of professional players.

Clive has worked with international power lifters and on a number of other fitness consultancies. These include a professional soccer club, the AELTC at the 2000 Wimbledon Tennis Championships, a world rally championship competitor and with several track and field athletes.

He specialises in intermittent and high-intensity sports, and is accredited as a strength and conditioning specialist (CSCS) with the National Strength and Conditioning Association (USA) and as an instructor of Speed, Agility and Quickness (SAQ) methods of training.

Clive is available for training sessions, seminars and lectures, and also individual programme designs. He can be contacted at [clivebrewer@scrum.com](mailto:clivebrewer@scrum.com).

## **Carbohydrate**

Carbohydrate is the most important fuel for the working muscles during rugby and should consequently make up the bulk of your diet - approximately 65% of the overall calorific intake. Whilst nutrition is a very individual thing, based upon metabolic rates and activity levels, a practical rule is to ensure that you eat between 8 - 10 grams of carbohydrate per kg body per day. This intake needs to be spread throughout the day. You should eat a variety of carbohydrate-rich foods, in order to ensure a good mix of all essential nutrients and it makes the diet more interesting!

Good sources of carbohydrate include breakfast cereals, all types of bread, oatcakes, rice cakes, cereal bars, pasta, rice, potatoes (avoid chips, which have a high fat content), corn-based products, pizza (be careful, as most toppings contain hidden fats), all types of beans, pulses, fruit & fruit juice.

Carbohydrates are classified according to the glycaemic index. Foods with a low glycaemic index (also known as complex carbohydrates, the majority of those listed above) provide a steady, slow release of sugars into the blood, thus ensuring a more constant energy supply which the muscles can store ready for exercise. These foods should be eaten 3-4 hours before training or playing, to

ensure that the muscle glycogen stores are loaded (a process not optimally achieved by consuming "simple sugars" close to performing). Conversely, high glycaemic index foods (also known as simple sugars) provide a much quicker supply of sugars to the body, raising the blood sugar levels quite rapidly. Examples of such foods include cereal bars, bananas, jellybeans, Jaffacakes and white bread. These foods are ideal for replacing muscle glycogen (the muscular carbohydrate store) after exercise.

Following exercise, not only are your glycogen stores depleted, but also there is a window of up to two hours when your body is optimally adjusted to replenish muscular glycogen stores. For this reason, you should aim to have 1g of carbohydrate per kg body mass (or at least 50g, e.g. two large bananas) during this period, and the same for every subsequent two hours until you sit down to eat a meal. If you prefer, drinking high-energy drinks, containing glucose, sucrose or maltodextrins in concentrations of 6ml/100ml can achieve this. These are different to the fluids that need to be drunk during exercise.

*Clive Brewer*

### **Carbohydrates - the Champion's Choice**

Training and nutritional status are the two most crucial aspects in determining successful outcomes in sports performance.

- It is not possible to perform adequate training regimens unless training activity is supported by appropriate nutritional support.
- Do you feel tired, lethargic and fatigued towards the end of a training session? Do you feel you are under-performing? If the answer to these questions is yes, then it is likely that the cause is inadequate or inappropriate dietary provision.
- Clearly, nutrition is a key component of success in rugby football.

For over 70 years the importance of carbohydrates as the fuel for exercising muscles has been recognised and there is now no doubt that adequate availability of dietary carbohydrate is essential to support training and successful rugby performance.

- Successive bouts of exercise will deplete the muscles and liver of their store of carbohydrate, known as glycogen. This will lead to fatigue and decreased performance.

#### **INADEQUATE CARBOHYDRATE - MUSCLE & LIVER GLYCOGEN DEPLETION - FATIGUE - DECREASED STAMINA - DECREASED PERFORMANCE**

- Consuming a high carbohydrate diet is an essential, everyday requirement for players wishing to avoid fatigue and impaired performance. Unfortunately, the typical diet in the UK is not high in carbohydrate.
- Your carbohydrate needs depend on the amount and intensity of the training you are doing but will be in the range of 6-10g of carbohydrate per kg of body weight per day.
- An intake of 6g per kg will support regular training but requirements may increase to 10g per kg body weight per day during intense periods of training or to support a busy competition phase.

The following table gives you a guide to your carbohydrate requirements.

<b>Your Body Weight (kg)</b>	<b>Approximate Carbohydrate Needs (g)</b>
50	300-500
60	360-600
70	420-700
80	480-800
90	540-900
100	600+

- Carbohydrate foods include both sugars and starchy or complex carbohydrates. The starchy carbohydrates are extremely useful sources of other nutrients, such as protein, vitamins, minerals and fibre, whereas refined sugary foods are often termed 'empty calories' as they tend to contribute little in the way of other nutrients. For this reason, the intake of complex carbohydrates from foods such as breads, cereals, pasta, rice, potatoes and fruit should form the basis for the increased carbohydrate content of your diet.
- The simple carbohydrate foods do play an important part in the diet of athletes, particularly when energy requirements are high, due to high training loads and competition demands, as they can be used to provide concentrated carbohydrate doses.

### **Top tips to increase carbohydrate intake**

- Serve bread at every meal, include: wholemeal, granary, ciabatta, pitta, naan, bagels, crumpets, rye bread, fruit breads, malt bread, seed loafs and teacakes, baps and muffins
- Toast and sandwiches should be made with doorstep slices of bread
- Oatcakes, rice cakes, crispbreads or Swedish baked rolls can be used as a tasty alternative to breads
- Portions of potato and other starchy vegetables, e.g. yam, plantain, sweet potatoes, butternut squash, should be increased
- Likewise pasta and rice portions should be substantial
- Lentils and beans can be added to casseroles and sauces or served as an accompaniment
- Fresh, stewed or dried fruit can be added to breakfast cereals and muesli
- Fruit can be eaten as a between meal snack
- Milk shakes and smoothies made with low fat milk, yoghurt and fruit such as strawberries or bananas are popular, particularly with young players

If you would like to add up your carbohydrate intake and plan a diet to meet these carbohydrate needs, you can use the Carbohydrate Ready Reckoner. You will soon get an idea of how your diet should look to fulfil your carbohydrate needs.

## **Kit Bag Carbs**

These high carbohydrate/low fat foods are ideal for refuelling after training or a match, or as a snack pre-exercise.

The quantities of foods listed below provide 50g carbohydrate.

In order to help recover muscle and liver glycogen stores, you should aim to eat 1g carbohydrate per kg of body weight IMMEDIATELY after exercise. Repeat this after two hours or until normal eating patterns have been resumed.

Use this list to put together suitable recovery snacks for your own body weight and requirements:

- » 500 ml Isotonic Sports Drink, e.g. Lucozade Sport, Gatorade, Boots Isotonic
- » 500 ml of fruit juice
- » 500 ml of low fat milkshake, e.g. Yazoo, Gulp, Frijj
- » 500 ml Smoothie
- » 300 ml Carbohydrate/Energy drink, e.g. Lucozade NRG, Lucozade Energy
- » 60g jelly sweets
- » 3 large bananas
- » 1 round of jam or honey sandwiches (thick sliced bread and plenty of jam/honey)
- » 2 Nutrigrain bars
- » 2 Rice Krispie Squares
- » 2 Mullerice
- » 1/3 Malt loaf
- » 1 bagel
- » 2 Go Ahead Cake Bar
- » 4 Go Ahead biscuits
- » 2 crumpets with marmite
- » 6 jaffa cakes
- » 2 fruit scones
- » 2 raisin and lemon pancakes
- » 2 currant buns
- » 1 ½ pop tarts
- » bowl of breakfast cereal with skimmed milk
- » 100g Twiglets
- » 60 g dried fruit
- » 4 Fig rolls
- » 1 pot Knorr Micro Rice
- » 1 McDonalds Milkshake
- » 200g low fat yoghurt topped with handful of breakfast cereal

*Clive Brewer*

## **Carbohydrate Ready Reckoner**

Aim for 6-10g carbohydrate per kg body weight per day.

To help you to appreciate the quantities of foods you need to eat to reach your daily carbohydrate goal the following table gives the amounts of different foods you would need to consume to get approximately 50g of carbohydrate.

<b>Cereals/ Biscuits</b>	Bread	3 large slices 1 large bag
	Muffin	1.5 muffins
	Crumpet	3 crumpets
	Oatcakes	6 oatcakes
	Malt loaf	3 slices
	Pop Tarts	1.5 pop tarts
	Jaffa Cakes	6 biscuits
	Weetabix	3 biscuits
	Cornflakes	9 tablespoons
	Rice Krispies	12 tablespoons
	Muesli	5 tablespoons
	Digestive biscuits	5 plain biscuits
	Breakfast bar	2 bars
	Popcorn	3 large handfuls
	Rice (cooked)	5 tablespoons
Pasta/noodles	10 tablespoons	
<b>Vegetables</b>	Potatoes (cooked)	1 large jacket potato 6 medium new potatoes 4 large tablespoons mashed
	Carrots	5 carrots
	Sweetcorn	Large serving
<b>Legumes</b>	Baked Beans	Large tin
	Lentils (cooked)	6 tablespoons
	Kidney beans (cooked)	6 tablespoons
<b>Fruit</b>	Banana	3 large
	Apple	3 apples
	Orange	3 large
	Fruit salad	Large portion
	Canned fruit in syrup	5 pears
	Dried fruit	3 large handfuls
	Juice, freshly squeezed	2 medium glasses
	Juice, unsweetened	2 medium glasses
Juice, sweetened	1 medium glass	
<b>Dairy</b>	Skimmed milk	1.5 pints
	Low fat yoghurt	2 pots
	Mullerice	1 pot
	Non-dairy ice cream	3 large scoops
	Low fat milkshake	1 large

<b>Sugary foods</b>	Sugar	6 heaped teaspoons
	Jelly Babies	Large handfuls
<b>Drinks</b>	Coke, Lemonade	1.5 cans
	Fruit squash inc. water	3 large glasses
	Lucozade Sport, Gatorade, Isostar	0.5 litres
	NRG, Lucozade Energy	300ml bottle

## Summary

Aim for:

- 6-10g carbohydrate per kg of body weight per day.
- Eat at least 1g carbohydrate per kg of body weight IMMEDIATELY following exercise.
- Include starchy forms of carbohydrate in your meals, as they will provide other nutrients.
- Sugary/refined carbohydrates can be useful for re-fuelling after exercise but remember to take care of your teeth!

*Clive Brewer*

## Drinking for Rugby

Water is essential to normal body function. For example, it has been shown that 5% dehydration can lead to a 20% decrease in performance. During exercise, the major water loss from the body is through sweat. If you are unsure how much water you can lose during a training session (which will obviously be influenced by environmental conditions), weigh yourself before and after training (remembering to remove wet and sweaty clothing). Every kg of weight lost is equal to 1 litre of water lost through sweating. This water must be replaced, both during matches and training, and you should be practised at both. Indeed, during rugby, keeping hydrated is more important than supplying fuel to the muscles.

Therefore careful consideration should be given to the drink that you are using to rehydrate yourself. Drinks that are too concentrated will slow the process of absorption from the gut into the body and consequently contribute to any dehydration effect. The drink which you are using should be diluted to between 4-8 ml of glucose / maltodextrin / electrolyte per 100ml of water. This is not always the strength recommended by the manufacturers of the cordial products. If you are unsure, remember that water is a much better option than an expensive sports drink that is mixed too strongly. As detailed earlier, after exercise, a different concentration of drink is required, in order to allow the delivery of carbohydrates to the body.

The body's mechanism of warning you that you are dehydrated is the feeling of thirst. Please note that this means that you are already dehydrated and not drinking enough. A good indicator of your hydration status in your urine: it should be clear and non-smelly, and you should be going to the toilet every 2-3 of hours.

*Clive Brewer*

## Eat to Train, Train to Eat

Many experts agree that second to training, diet exerts the most significant effect on sporting performance. With matches won and lost by such small margins is

diet and area of your preparation that YOU can afford to neglect?

In my experience nutrition is often something an athlete may consider comes into play on competition day with a focus on the 'pre-match meal' and 'energy drinks'.

In fact it is the training diet that has the greatest potential to influence your performance. Optimum diet will support high quality high intensity training, which of course leads to high quality match play.

At whatever level you play your rugby you need to meet your nutritional needs if you are to reap the maximum returns from your training.

### **Optimum Diet Checklist:**

- Are you happy with your body weight, shape and muscle to fat ratios?
- Have you identified nutritional strategies that work for you in both training and competition?
- Do you eat high carbohydrate foods within one hour of training?
- Do you set and achieve targets for your intake of fluids and carbohydrates in the recovery phase following training?
- Can you sustain 100% training effort over the entire training session?
- Do you know how to tell if you are well hydrated?
- Do you know the difference between isotonic and hypotonic sports drinks and energy drinks? Do you know which products if any could help your performance?
- Do you know the optimum time to eat and drink prior to exercise?
- Do you follow nutritional guidelines for long-term good health?

If your answer to all of these questions is YES, CONGRATULATIONS! You are maximising the potential nutrition can have on your rugby performance.

If the answer to any of these questions is NO you may find the following information plus future articles on this site useful.

### **The Basic Principles of Good Nutrition**

There is no such thing as a bad food; it is how foods are combined into your overall diet that determines whether you will achieve your nutritional goals. Foods are a complex mixture of nutrients, which interact with each other and with the nutrients in other foods eaten at the same time.

The body must obtain energy plus over 40 other nutrients, essential for life, from foods. Additionally there are other groups of food components such as dietary fibre, carotenoids and some trace elements such as boron that are not considered essential but which are important for the maintenance of health and possibly for preventing chronic disease.

For many of these nutrients it is possible to define reference values or guidelines as to optimum intake for health. Additionally it is also recognised that an individuals requirements for each of these nutrients can be affected by factors such as an active lifestyle and the demands of training and competition.

*The First Simple Step - Variety is the spice of life!*

*The challenge of the training diet is to provide sufficient energy and of each of the*

*essential nutrients to meet the demands of the training. Because the essential nutrients are found in a wide range of foods it is important that the diet is drawn from a wide variety of foods and not limited to just a few.*

*Remember to include foods from all the major food groups in your diet:*

### **Starchy Foods**

*Breads, potatoes, breakfast cereals, pasta, rice, noodles, oats, chapattis etc*

*These foods should make up a substantial part of each of your meals and snacks.*

*These foods contain starch a type of carbohydrate important in providing the fuel for exercise. These foods also contain calcium, fibre, iron and B vitamins. Many breads and breakfast cereals are also fortified with vitamins and minerals. Whole grain/meal varieties will provide more fibre.*

### **Fruits and vegetables**

*Aim for at least 5 portions of fruit and vegetables each day.*

*Fresh, frozen, canned, dried, fruit juices, beans and pulses all count towards this goal of 5 a day.*

*Fruits and vegetables are important sources of vitamins including vitamin C, carotenes (a form of vitamin A), folic acid; fibre and also provide some carbohydrates.*

### **Meat, Fish and alternatives**

*Meat, meat products, offal, poultry, fish, eggs, nuts, beans and pulses, meat substitutes e.g. Textured Vegetable Protein (TVP), soya protein.*

*These foods provide protein, B vitamins, minerals such as zinc, iron and magnesium.*

*Choose lower fat versions of meat and meat products. Remove all visible fat from meats and remove the skin from chicken and poultry. Cook these foods without adding additional fat eg grill, dry fry, roast, casseroles etc  
Meat alternatives such as lentils, beans etc are low in fat.*

### **Milk and dairy products**

*Milk, cheese, yoghurts, fromage frais, butter, eggs and cream.*

*These foods contain calcium, protein, vitamins including A, D, B12 and riboflavin.*

*Try lower fat versions of these foods, e.g. skimmed or semi-skimmed milk, low fat yoghurts, lower fat spreads and lower fat cheeses e.g. Edam*

### **Fats, Oils and Sugary Foods**

*Butter, margarine, oils, mayonnaise, salad dressings, biscuits, cakes, puddings, crisps, chocolates, pastries*

*These foods should be used sparingly, although in the extremely active player we may call on the sugary foods as a carbohydrate source at particular times to support training and match play.*

*There are of course some foods that as a rugby player you need more of than others e.g. the starchy, carbohydrate rich foods such as pastas, potatoes, breads,*

*cereals, rice etc, whilst although still an important part of the diet, fatty foods and oils are need in smaller quantities.*

*Anne Price*

## **Protein**

As an indication, Top-level rugby players need between 1.2 and 1.7 g of protein per Kg body mass per day. This is usually adequately achieved through a sensible and varied diet. Protein is of primary importance in the growth and development of the body, as well as being important in maintaining a healthy immune system. The following list details sources of protein in the diet. It should be remembered however that some of these foods are high in fat content, and that vegetable protein is usually of a lower quality than animal protein.

### ***Good sources of protein in the diet:***

#### **Animal**

Meat, poultry, offal

Fish

Eggs (protein in the whites)

Milk, cheese, yoghurt

#### **>b>Vegetable**

Beans - baked, haricot, kidney, etc

Pulses

Nuts and seeds

Soya products

Bread, potatoes, pasta, rice, cereals

*Clive Brewer*

## **Fats**

Fats form an essential part of a healthy diet. However, given that even the leanest players have large reserves of fat, there is no need to consume a lot of fat in the diet. Whilst many fats are easy to see, and therefore avoid (e.g. cream, dripping, butter, fat on meat), much of the fat players intake through their diet is not so obvious. Such fats are hidden in sauces that accompany foods; in meat, especially red meat; in the oils that food is cooked in; within nuts and seeds and also in products containing milk, such as cheese or chocolate.

### ***Practical hints to decrease the fat content of your diet include:***

- Buy low fat varieties where available.
- Use low fat spread only in small amounts (if at all).
- Avoid whole milk, cream, evaporated or condensed milk.
- Keep pastry products to a minimum.
- Eat less red meat: Replace with white meat or vegetables.
- Be careful of hidden fat in sauces.
- Trim excess fat off meat.
- Boils, grill, and microwave rather than roast or fry.

Using food labels on products will help you to select appropriate foods to eat. These will show you the amount of fat per 100g of product, and the amount per average serving. Try to choose, where possible, the lowest fat content food. For example, if you require a mid-afternoon snack, a typical

Cornish pasty may have 35g of fat, whereas a Tuna and salad sandwich may only have 5.4g. Such information would also be important in calculating your daily protein and carbohydrate sources.

The sensible rule with fat products is one of moderation. Whilst it is important to have the occasional binge, it is equally important that this does not become a habit. Fuelling the body appropriately, and maintaining body weight, are essential components of top level performance.

*Clive Brewer*

## **When to Eat**

The process of digestion is an active one, and therefore calories are burned up in the process. Therefore, it is better for smaller meals to be eaten more frequently than larger meals less often. This also helps to ensure that the body has a relatively constant supply of energy. You should eat a meal of high G.I. foods 3-4 hours prior to a game, as detailed earlier. However, should you feel hungry prior to a game (or you feel that your blood sugar levels need to be topped up), foods that have a high G.I. but low fat content, and which will not rest heavily in the stomach, (for example, Jaffa cakes, or jelly babies) are good foods to consider. It is therefore good practice to take a packet of these to games with you for this purpose.

As a general rule of thumb, your metabolic rate begins to slow around 8pm. Therefore, any calories consumed after this time will not be burnt off. It is important however that you don't go to bed on an empty stomach if you haven't eaten a meal by this time. Because the metabolism slows overnight, it is important that you provide the body with a stimulus to "kick-start the system" in the morning, when the body has been a number of hours without food.

Your eating pattern should therefore consist of a large (a relative term) breakfast, with small, frequent meals (not snacks) throughout the day, and a light meal in the early evening.

*Clive Brewer*

## **Fuelling Optimum Rugby Training**

As a player progresses through the various standards of rugby, optimal nutrition becomes not only a distinct advantage, but also an essential lifestyle factor if training is to be maximised and excellent performance levels achieved. What is eaten on a daily basis affects your energy levels, and consequently performance.

The aim of this paper is to provide information about how a player may achieve optimum energy levels; An attempt to change the tradition "who ate all the pies" attitude to one of "who ate all the carbohydrates, proteins, vitamins and minerals!" It is important that the energy balance is maintained within you, so that energy intake equates to your energy expenditure. Excesses in energy intake are stored in the fat cells of the body. As fat contributes little to the energy provision for the sport of rugby, such stores represent useless weight, and should therefore be minimised. Conversely, if energy intake is insufficient (remember that your energy requirements will increase with an increase in training volumes), the body will obtain energy by utilising substances such as proteins, causing a deficiency in the ability to repair tissue following training. Over time, this will result in the body entering a catabolic state, which will lead to a decrease in the performance potential, and an increased risk of becoming injured.

Improving fuelling of your rugby training and performance involves the analysis of 3 major components of the diet: Carbohydrates, proteins and fats. Dietary fibre is also an essential part of the diet, which has no nutritional value, but has an important role to play in maintaining a healthy excretory function. Fibre is found within all cereal products and also in fruit and vegetables. Vitamins and minerals are also important considerations in a healthy diet. However, mineral deficiencies are rare in athletes, with the possible exceptions of iron, particularly in vegetarians, and also calcium. It is rare that a player eating a balanced diet requires supplementation of vitamins, and some may have a detrimental effect on training.

In order to obtain sufficient energy for top-level performance, your total energy intake should comprise a diet of 65% carbohydrate, 22% fat and 13% protein.

*Clive Brewer*