



Sports Nutrition # 1

CARBOHYDRATES

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Overview:

Carbohydrates are perhaps the most important nutrient required by the body to help it perform any sporting activity. The trouble is, very few people actually know why. In this edition of Marathon Consultancy "Sports Nutrition Advice," we give you the low down on how to use carbohydrates to aid performance and help you train and compete at a an optimum level

Carbohydrates in the body

The brain is arguably the most important organ in the body and it requires a steady supply of fuel to keep it alive and functioning optimally. It is the simplest form of carbohydrate, glucose, which feeds the brain and without it, a number of health conditions can arise. However, this is not an excuse to jump straight for sugary foods; your body is much smarter than that.

Once eaten, the more complex carbohydrates such as rice, pasta and potatoes, are broken down into monosaccharides with the help of digestive enzymes, so the body can transport them in the blood to be utilised.

The body's internal regulation system automatically directs sugar to the areas where it is needed such as the brain or working muscles.

So that we don't need to keep eating carbohydrates every hour of the day to meet demand, the body stores carbohydrate away in our muscles and liver in the form of a substance known as *glycogen*.

During your training, you are reliant on you bodies internal glycogen store to keep you legs moving. Without a sufficient amount of glycogen, your race or



training run will slowly grind to a halt. Although protein and fat stores can be used to fuel movement, they are much more difficult to breakdown and utilise as a fast source of energy.

The Importance of Glycogen

The human body can store somewhere in the region of 500g of carbohydrate in the form of glycogen. 100g of which is stored in the liver and 400g is stored in the muscles. These stores are enough to take you to about mile eighteen



(thirty kilometres) of the marathon. This is the point where people say they hit the dreaded wall because without sufficient glycogen, a quick energy source is unavailable, causing the body to turn to alternative stores of energy such as fat and protein to keep movement sustained. The process of converting fat and protein into quick energy is complex and the body is unable to do it quickly enough to meet energy demands, ultimately leading to deterioration in performance.

If carbohydrate stores remain low, an insufficient supply of sugar is available to keep the brain working properly, giving rise to symptoms of dizziness and confusion. If exercise is continued with these symptoms, a runner's health can very quickly deteriorate causing the athlete to collapse and fall very ill. This drop in blood sugar is known as *hypoglycaemia* and is explained in more detail later.

Glycogen is important for any endurance event, but it is in the marathon where it is of utmost importance.

During a half marathon race, it is unlikely that you will deplete all of your glycogen stores as your liver and muscles are able to provide enough to see out the 13.1 mile (21km) race. It is still important however to ensure you have eaten correctly in the days running up to race. If your glycogen stores are not filled sufficiently before the race, your pace may begin to slow towards the end as you begin to run out of energy and your blood sugar begins to drop.



A runner suffering from hypoglycaemia

Timing carbohydrate intake

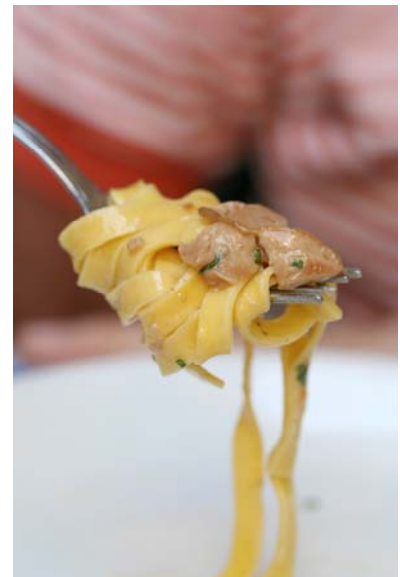
Ensuring that you have sufficient carbohydrate to train and race effectively is not quite as simple as you may think. Unlike refuelling a car, the timing of your carbohydrate intake is vital, due to the role of enzymes in the body.

Immediately after exercise, the body secretes large amounts of an enzyme called *glycogenase*, making the muscles and liver highly receptive to absorbing and storing carbohydrate. The increased level of glycogenase in the blood is raised for about two hours, with this time frame being the optimum window for the lost carbohydrate stores to be replaced. Numerous studies have been performed on this subject and the evidence is overwhelming in favour of consuming a rich carbohydrate meal or drink soon after a training run. If insufficient carbohydrate is eaten and the timing is wrong, performance can be severely compromised in subsequent training runs often leaving runners confused as to why they feel so tired.

How much Carbohydrate?

A common mistake made by many new endurance runners is that because they are exercising more than they ever have done before, they think they can get away with eating like a horse and make the excuse that it is necessary to do so because, “they are in training.”

Whereas it may be true that a runner’s diet needs to be richer in carbohydrate than the average person, eating large quantities of carbohydrate rich snacks such as doughnuts, biscuits, cake and chocolate can be counter productive. Naturally, your calorific intake will need to increase as you progress through your training programme but it is important not to lose sight of the fact that many carbohydrate snacks are also high in saturated fat. Before you know it, you could easily end up consuming more calories than you are expending.



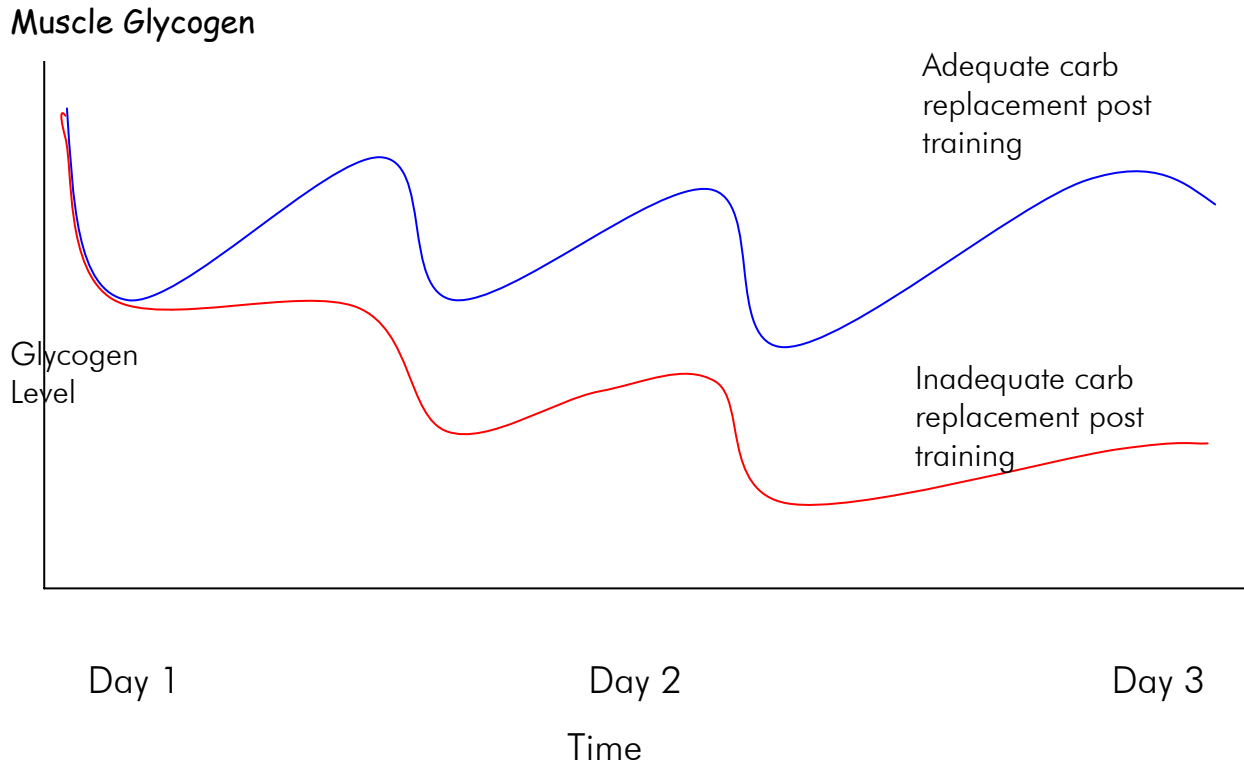
The most effective way to ensure you are eating sufficient amounts of carbohydrate is to concentrate on eating the complex carbohydrates such as wholemeal bread, rice, pasta and potatoes. Initially, try measuring out your food so that you get an idea as to the quantity of carbohydrate needed to meet your training demands, it may surprise you.

One of the worlds leading sports nutritionists, Dr Michael Colgan, devised the following table to estimate the daily carbohydrate (in grams) requirements of athletes:

Bodyweight	Training Hours			
	1	2	3	4
50	200	300	400	500
60	300	400	500	600
70	400	500	600	700
80	500	600	700	800
90	600	700	800	900
100	700	800	900	1000
110	800	900	1000	1100

This is of course a general guide and may not suit every runner's biochemical individuality. If you find you are putting weight on after a few weeks of training, it may be a good idea to revise your carbohydrate intake and perhaps reduce it a little.

Whilst training, your diet should make up as much as 65% carbohydrate. Evidence suggests that training performance can be greatly affected if insufficient carbohydrates are consumed. Studies on athletes such as the one below, have discovered what effect on glycogen stores a 30% drop in carbohydrate can have. Overtime, this carbohydrate deficiency could mean the difference between crossing the finishing line with a smile on your face and not finishing the race at all.



Types of Carbohydrate

<u>Type</u>	<u>Food examples</u>
Polysaccharides (Complex CHO)	Bread, pasta, rice, cous cous, potatoes, noodles, beans, pulses
Monosaccharides & Disaccharides (Sugars)	Table sugar, glucose syrup treacle honey, sweets, chocolate, sports drinks