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This information is taken from 'Fuel for Performance, Nutrition for Sport',  
a sports nutrition resource updated and revised by the following Welsh sports dietitians:  
Rhian Owen, Chris Cashin, Elaine Hibbert-Jones and Gill Regan.  
Every acknowledgement is given to all the sports dietitians who contributed to the original publication  
of this resource, which was first published in 1998.

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## **Carbohydrate - the fuel for exercise**

Carbohydrate (CHO) is the most important fuel for the working muscles. It is essential for any form of exercise.

The body only stores small amounts of carbohydrate in the liver and muscles as glycogen. During exercise, glycogen is broken down to glucose, which provides energy for the working muscles.

Blood glucose level (the level of sugar in blood) is affected by the digestion of foods containing carbohydrate. Many factors affect how a food or drink influences your blood glucose level. Research is being undertaken to investigate the effect of these factors on the blood glucose level. As new research becomes available, there may be new ways to classify carbohydrate foods. The historical way to classify carbohydrate foods in our diets is to split them into two main types – starchy carbohydrates and sugary carbohydrates.

Starchy carbohydrates provide other nutrients such as vitamins and minerals in addition to energy. Sugary carbohydrates are often termed "empty calories" as they only provide energy but they can be useful if you are having problems eating sufficient quantities of starchy carbohydrates. Many sugary carbohydrates can contribute to tooth decay. It is therefore important to maintain good dental hygiene and take advice from your dentist if you regularly rely on these as a source of carbohydrate. Eating a variety of carbohydrate-rich foods will ensure a good range of nutrients are provided.

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## Main types of carbohydrates

Main types of carbohydrate	Dietary sources
<p style="text-align: center;">Starchy carbohydrates most of these are digested and absorbed slowly and lead to a gradual rise in your blood glucose level, providing a steady supply of energy over a longer period of time. It is important to eat regular meals, with a starchy carbohydrate food at each meal.</p>	<p>Grains e.g. wheat, barley, rye and oats Breads and flour products e.g. currant buns, scones and teacakes Breakfast cereals Pasta Cous cous Rice Potatoes and potato products Pulses e.g. baked beans, red kidney beans, peas and lentils</p>
<p style="text-align: center;">Sugary carbohydrates most of these are digested and absorbed quickly and lead to a rapid rise in your blood glucose level, providing an immediate energy supply</p>	<p><b>Food and drink containing natural sugars:</b> Fruit and fruit juices Milk and milk products e.g. yoghurt, mousse, custard and ice cream Honey <b>Food and drink containing added sugar:</b> Sweet foods e.g. sweets, chocolates, desserts, jams, marmalade and sugary drinks</p>

**Please note:**

Many sugary carbohydrates can contribute to tooth decay. It is therefore important to maintain good dental hygiene and take advice from your dentist if you regularly rely on these as a source of carbohydrate.

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## Good sources of carbohydrate

### Starchy carbohydrates

- Breakfast cereals - all types e.g. Porridge, Weetabix<sup>®</sup>, Shredded Wheat<sup>®</sup>, Shreddies<sup>®</sup>, Bran Flakes<sup>®</sup>, Special K<sup>®</sup>, Corn Flakes<sup>®</sup>, Rice Krispies<sup>®</sup>
- Bread - all types, including bagels, crumpets, french bread, English muffins, naan bread, pitta bread, bread rolls, toast and tortilla wraps.
- Pasta, noodles, pizza bases
- Potatoes - all varieties e.g. boiled, jacket, mashed, instant mashed, waffles
- Rice and other grains e.g. bulgar wheat, cous cous, pearl barley
- Pulses e.g. mushy peas, baked beans, red kidney beans, black-eyed beans, cannellini beans, borlotti beans, butter beans, chick peas
- Starchy vegetables e.g. sweetcorn, sweet potato, yam
- Lower fat savoury snacks e.g. breadsticks, popcorn, twiglets<sup>®</sup>
- Lower fat rye / corn / rice / crispbread snacks e.g. crackers, crispbreads, rice cakes, Ryvita minis<sup>®</sup>, Special K Lite Bites<sup>®</sup>, Snack a Jacks<sup>®</sup>

### Sugary carbohydrates, including natural and added sugars (some will also provide starchy carbohydrates)

Many sugary carbohydrates can contribute to tooth decay. It is therefore important to maintain good dental hygiene and take advice from your dentist if you regularly rely on these as a source of carbohydrate.

- Sugar - added to drinks, breakfast cereals etc
- Sweetened breakfast cereals and lower fat breakfast bars and cereal bars
- Milk and milk products e.g. milkshakes, yoghurt, yoghurt smoothies
- Energy bars and fruit bars
- All varieties of fruit; fresh, dried, canned or as juice or smoothie
- Biscuits e.g. fig rolls, garibaldi, jaffa cakes, jam filled sandwich biscuits e.g. Jammie Dodgers<sup>®</sup>, Fruit Jambos<sup>®</sup>, semi-sweet biscuits e.g. rich tea, marie
- Cakes e.g. scones, fruit cake, bara brith, fruit loaf, malt loaf, teacakes, fruit buns, swiss roll, iced buns, scotch pancakes, Welsh cakes
- Puddings e.g. bread based puddings, fruit crumbles, low fat milk puddings, jellies, low fat custard, low fat fruit yoghurts
- Syrups and preserves e.g. fruit spread, honey, jam, lemon curd, marmalade, syrup, treacle
- Sweetened soft drinks e.g. cola, lemonade, fruit drinks
- Confectionery e.g. boiled sweets, fruit gums / jellies, fruit pastilles, jelly babies<sup>®</sup>, jelly beans, marshmallows, wine gums
- Sports products containing carbohydrate e.g. glucose polymer drinks, sports bars, energy gels

*Remember, it is best to choose lower fat high carbohydrate options*

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## Practical ways to increase your carbohydrate intake

Base meals and snacks around carbohydrate rich foods such as:

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|---------------------|---|
| Bread               | eat plenty and cut it thick. Try including different types e.g. white, granary, wholemeal, crusty, pitta, bagels, toast and muffins are excellent sources of carbohydrate.  |
| Pasta & noodles     | try the different shapes, colours and types. Microwaveable pasta sauces are a quick solution to add to a pasta or rice meal.  |
| Rice & other grains | try different types e.g. bulgur wheat, cous cous, quinoa. Microwaveable rice saves time.  |
| Breakfast cereals   | are good sources of carbohydrate and can be eaten at any time of day e.g. as a mid-afternoon or late night snack.   |
| Pulses              | add canned baked beans, chick peas, red kidney beans or sweetcorn to canned soups or add to the sauce in pasta or rice dishes, stews and casseroles.  |
| Fruit               | can be eaten as part of a meal or snack or added to meals and snacks to increase the carbohydrate content e.g. dried fruit on breakfast cereals, banana on toast, tinned fruit with low fat custard, fruit smoothies. |

When energy and carbohydrate needs are high, increase the number of meals and snacks you eat rather than the size of your meals.

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