

Podium 4 Sport Nutrition & Hydration Workshop Information

Introduction

‘Diet significantly influences athletic performance. An adequate diet in terms of quantity and quality, before, during and after training and competition will maximise performance’ *International Olympic Committee Consensus statement, 1991.*

Most people are aware that a healthy balanced diet is essential for optimum health and wellbeing. For people involved in sport at an amateur, professional or elite level, the importance of good nutrition and a healthy diet is even more relevant, as shown above. Here we look at key sports nutrition messages which coaches and athletes need to be aware of to help produce winning results!

Below, we’ll cover 4 key areas:

- **Section one: Carbohydrates: what’s the big deal?**
- **Section two : Protein**
- **Section three: The ‘F’ factor – Fluid and hydration**
- **Section four: Anti-oxidants, immune function and sport**

Key messages:

- **Section one: Carbohydrates: what's the big deal?**

Carbohydrate is the main source of energy that the body uses during exercise. So it makes sense that athletes need to consider the carbohydrate content of their meals before, during and after exercise. Here we look at good sources of carbohydrate and practical ways of incorporating them into the athletes' diet remembering that eating for sport should still be enjoyable.

- **Section two : Protein**

Protein is essential for the growth and repair of tissues within the body. This is even more important in the context of sport, given the high risk of injury due to competition and overtraining. We will look at the good sources of protein in the diet and how to incorporate them to help aid recovery following exercise.

- **Section three: The 'F' factor – Fluid and hydration**

During exercise our muscles produce heat which is lost from the body through sweat. Whenever we loose sweat we are at risk of dehydration and poor performance, therefore it is extremely important that athletes have a hydration strategy in place to combat this. We look at the type, timing and volumes of fluid which athletes should be consuming when undertaking exercise to maintain optimum performance.

- **Section four: Anti-oxidants, immune function and sport**

Everyone knows that we should aim to eat five portions of fruit and vegetables everyday but most people don't know why. Here we look at different ways to get your daily dose of anti-oxidants which can help strengthen the immune system. This is extremely important for athletes who can sometimes become run down as a result of intense training and competition, especially during the winter months.

Section one

Carbohydrates: what's the big deal?

Carbohydrate is the main source of energy that the body uses. We store carbohydrates as glycogen in the body in our muscles and liver. During training it is important to increase your intake of carbohydrate as you will be using more energy than in everyday life. Think of your body like a machine running on batteries – without batteries (i.e. carbohydrates) it simply will not have the energy to function properly.

Carbohydrates are found in a wide range of everyday foods, and generally speaking whenever you are training and competing you should aim for at least half of your daily energy intake to be from carbohydrates. This can be achieved by ensuring you eat a range of carbohydrate rich meals and snacks before, during and after exercise. By eating more carbohydrate you will replenish the body's glycogen stores, which are broken down during exercise, helping you to exercise for longer without becoming tired or impairing your performance.

Follow some of our top tips for carbohydrate rich meals and snacks to help boost your performance:

Breakfast

- Porridge with honey or golden syrup
- Pancakes with maple syrup
- Warm rolls or muffins with sliced banana, honey, marmite, jam, peanut butter
- Poached egg on thick sliced wholemeal toast
- Muesli or breakfast cereal with semi-skimmed milk and sliced fresh fruits
- Grilled Tomatoes with thick sliced wholemeal toast
- Try making your own fruit smoothie with fresh fruit of your choice, milk and low fat yoghurt
- Baked beans on toast with mushrooms
- Fruit Juice (which will also count as one of your five a day)

Lunch

- Pasta dishes with sauce are great, but try to avoid creamy sauces and mayonnaise as this will only increase the fat content of your diet
- Sandwiches are quick, easy and nutritious when you are on the go. Always choose thickly sliced bread as opposed to thin slices as they will contain more carbohydrate
- Baked potatoes with low fat fillings (beans/chicken/tuna). Try adding some cheese, which is high in calcium which is essential for growing bones.
- Beans on toast, good source of carbohydrate and protein for growing bodies
- Toast with banana and honey or a light sprinkling of sugar
- Couscous (quick and easy just add hot water) try adding some herbs/spices and some roasted vegetables adding to your 5 a day.
- Quick cooking noodles/rice/pasta
- Risotto made with tuna, lean ham or chicken
- Leek and potato soup
- Instant soups: which you just add water to, are handy on the go and are great with sandwiches.

Main meals

- Deep pan pizza (thick crust will contain more carbohydrate), just remember to go for healthy toppings rather than meat and cheese options
- Rice/pasta with low fat meat and vegetable sauce
- Stir fry with your choice of meat and lots of vegetables – add your favourite herbs and spices
- Baked/poached fish with jacket potatoes and vegetables
- Roast chicken with jacket potato and steamed vegetables
- Grilled chicken breast with mashed potato/sweet potato or boiled rice
- Macaroni cheese

Desserts: For those with a sweet tooth!

- Fruit crumble with custard – use fresh fruits that are in season
- Pancakes with fresh fruit
- Yoghurt & fromage frais
- Jelly and custard (for the kid in you!)
- Milk puddings (rice pudding, semolina) with jam and dried fruits

Carbohydrate rich snacks

These are particularly useful to ‘top up’ glycogen stores immediately after training or competition, either in the changing room or on the way home from an event. They should then be followed up with a carbohydrate rich meal as soon as possible after the event.

Stay away from snacks that are high in fat and sugar and fill up on these tasty and nutritious alternatives:

- Muffins, pancakes or crumpets with honey, syrup or sugar and cinnamon
- Multigrain cereal bars
- Fresh fruit, dried fruit and nuts
- Low fat crisps
- Fruit yoghurt with added raisins/ sultanas
- Flavoured milk drink/ fruit smoothies
- Toast/scones with low fat spread and jam
- Fruit squash, fruit juice or sports drink
- Low fat rice pudding
- Sports bars and drinks

Points to remember

- You need to fine-tune your carbohydrate practices in training. Don't make any radical changes to your diet just before a big event or competition. Practice makes perfect so work towards getting a carbohydrate strategy that works for you.
- Choose carbohydrate rich meals and snacks that are practical, enjoyable and are based on tried and tested experiences. Eating for sport should still be a pleasurable experience!
- Make the most of every opportunity. If you have any natural breaks/ substitutions during training or competition, take on some extra carbohydrate if you can. This could be from sports drinks/ jelly babies/ jellybeans or a quick cereal bar. This will top up your energy stores and help reduce tiredness and fatigue ultimately improving your performance.

Section two

Protein

Protein is not an available source of energy during exercise except in the case of extreme endurance athletes. It is however, *essential* for the growth and repair of tissues in the body. Given this role in the body, it is extremely important that children and adolescents who are still growing and participating in sport include good quality sources of protein in their daily diet (see list overleaf).

There are some myths surrounding protein, including the consumption of large amounts of protein to build muscle. This strategy is *only* useful in the case of professional body builders who are altering other components of their diet under the guidance of a sports nutritionist. Excessive protein intake may increase total calorific intake, increasing the chances of weight gain as excess protein will be turned into fat!

What if I am injured?

Athletes who have experienced muscle or tissue damage following training or competition should focus on eating good quality sources of protein during their recovery period.

Protein and recovery

There is some scientific evidence which suggests that the combination of carbohydrate and protein helps to replenish the body's carbohydrate stores more effectively and prepares you for your next workout. In order to benefit from this you should try and include a source of good quality protein in your post exercise meal. For example: wholemeal pasta with a lean beef and tomato sauce provides carbohydrate, protein and anti-oxidants from the tomato sauce.

Good sources of protein

Animal sources

- **Eggs:** the highest quality source of protein. Try omelettes, boiled, poached or scrambled eggs with toast to combine protein and carbohydrate, avoid frying!
- **Tuna:** canned/fresh, if using canned go for tuna canned in sunflower oil which is also a good source of the anti-oxidant vitamin E and is a heart healthy oil.
- **White turkey & chicken meat:** perfect addition to sandwiches for a lunch rich in carbohydrate and protein.
- **Lean beef:** a good source of protein, iron and extremely versatile
- **Fish:** oily or white fish are both good sources of protein. Oily fish have the added benefit of providing omega 3 fatty acids which are good for your heart, so you should try to incorporate them into your diet if possible.

Oily fish include: herrings, kippers, mackerel, pilchards, salmon, trout, swordfish, eel, crab, fresh tuna and sardines.

White fish include: cod, whiting, pollock, plaice, sea bass and monkfish.

Dairy sources

- **Milk:** another high quality source of protein which also provides calcium that is essential for growing children and adolescents.
- **Cheese:** great in sandwiches, baked potatoes and added to soups.
- **Yoghurts:** a great post exercise carbohydrate and protein snack.

Plant sources

- **Peanuts**
- **Wholemeal bread**
- **Baked beans**
- **Tofu**
- **Almonds**
- **Lentils**
- **Chick peas**
- **White & brown rice**
- **Soybeans**

Practical tips

- Choose a variety of protein rich foods (see list above)
- Protein intake should be distributed throughout the day, don't just rely on your evening meal to fulfil your daily requirements.
- Always choose lean meat and low-fat dairy products as many protein-rich foods also contain hidden sources of saturated fats. Saturated fats are linked to an increased risk of developing cardiovascular disease in later life.
- If you are a vegetarian or vegan athlete, you need to make a special effort to ensure that your diet provides enough good quality protein. By mixing different sources of vegetable proteins such as baked beans on toast, lentils and rice or a peanut butter sandwich you will achieve good protein combinations. Vegetarian and vegan athletes also have to give extra consideration to the iron content of their diet due to the avoidance of red meat. To increase the iron content of their diet they should increase their intake of non-haem/plant sources of iron. This includes dark green leafy vegetables such as: broccoli, savoy cabbage, spinach, curly kale and whole grains.

Word of caution: whilst vegetarian and vegan athletes need to be aware of the iron content of their diet, iron supplements should NOT be used as a 'back up' source of iron. Iron supplements should only be used following the diagnosis of iron deficiency anaemia by a GP. High doses of iron can prevent the absorption of other essential trace elements in the body with serious side effects. If a coach/parent suspects an athlete may be iron deficient they should refer them to their GP immediately.

Section three

The 'F' factor: Fluid and hydration

Why is water so important?

Our bodies are made up of between 40 to 70 % water depending on age, weight, gender and body composition, so it makes sense that it has many important functions within the body. During exercise our muscles produce heat which the body must get rid of to prevent overheating, and heatstroke. To do this, heat from the muscles is transferred to the blood, blood flow to the skin is increased and heat is lost by the evaporation of sweat from the skin. Sweat comes from water in the body so we need to make sure we replace this vital fluid to prevent dehydration which (as scientific studies have shown) leads to poor performance. As with carbohydrate intake it is important to get your hydration strategy right before, during and after exercise, thereby ensuring you are fully hydrated. This in turn will improve your performance.

Pre exercise

- The aim of pre-exercise hydration is to start every training session/match well hydrated. In addition to including fluid as part of your daily routine, you should aim to drink between 400-600 mls of water, sports drink or other fluid in the two hours prior to exercise. Hydration status can be monitored through the use of 'pee charts', which grade the colour of urine. Urine, which is pale yellow in colour, suggests good hydration. **REMEMBER:** It is important to practice hydration strategy before all major events. By doing so you will avoid feeling bloated and heavy whilst exercising.

During exercise

- During exercise the aim is to replace fluid losses incurred by sweating preventing excessive dehydration. Every athlete should develop his or her own strategy for drinking during sport. This will depend on how much sweat is usually lost during exercise and will be affected by the heat and humidity of exercising conditions. Generally speaking, for exercise which lasts over an hour, a guide might be to aim to drink 150-250 mls every 15 minutes during exercise to offset fluid losses. You should make the most of every opportunity to take on fluid, so always have your own water bottle handy to keep your hydration levels topped up.
- Providing an additional source of carbohydrate during exercise can help improve performance by topping up your energy levels. One way to achieve this is the use of sports drinks. Sports drinks are designed to tackle both fluid and energy loss by providing: fuel in the form of carbohydrate, fluid to replace what is lost as sweat and sodium to help the body retain fluid. The combination of these three factors will help prevent dehydration, ultimately improving your performance and recovery.

If you choose to use sports drinks it is important to remember the following to ensure good dental health:

- Drink quickly and avoid sipping slowly
- Don't 'hold' or 'swish' drinks around your mouth
- Brush teeth twice a day using fluoride toothpaste
- Visit your dentist regularly

After exercise

After exercise the aim is to **FULLY REHYDRATE!** How much fluid you need will depend on how much you have lost. This will vary depending on the duration and intensity of exercise performed as well as the climatic conditions – on a hotter day you will sweat more and will therefore need more fluid to rehydrate before your next training session. As a general guide you should aim to drink 500mls of fluid following exercise. This amount can then be increased until the colour of the urine returns to pale yellow and you are fully hydrated. The use of sports drinks post exercise will also help you to rehydrate and 'top up' your muscle glycogen stores in preparation for your next training session.

Section four

Anti-oxidants, immune function and sport

Everyone knows that we should aim to eat five portions of fruit and vegetables every day for the maintenance of good health. But what most people don't know is that fruit and vegetables contain a combination of anti-oxidant vitamins and minerals which can help strengthen the immune system protecting our bodies against coughs, colds and flu. Here we look briefly at what the immune system is, why proper functioning of it is crucial for athletic performance and, most importantly, how we can ensure our diets are rich in anti-oxidants vitamins to produce winning results.

What is the immune system?

The immune system is a highly complex group of cells and hormones which work together to defend the body from germs and viruses we come in contact with in the outside world. If for some reason, immune function is compromised then our ability to fight off germs will be reduced and we will be at increased risk of developing more coughs, colds and flus than if we were fighting fit.

Are athletes at increased risk of infection?

Unfortunately, yes. There are several reasons why athletes at amateur, semi professional and elite level are at increased risk of developing infections as a result of decreased immune function. These include intense training sessions and competition without sufficient recovery time, training in cold, damp weather (during the summer and winter!) as well as the physical and mental demands which sport places on the body. All of these contribute to the weakening of the immune system.

Implications for athletes

If athletes suffer from coughs, colds and flus on a regular basis as a result of decreased immune function then it makes for missed training sessions. This diminishes the opportunity to perfect skills and improve fitness levels which ultimately result in poor performance on an individual and team basis.

Is there anything that coaches and athletes can do to improve immune function?

YES, by ensuring that athletes get enough rest between training and competition and eating plenty of foods rich in anti-oxidants, the immune system will have everything it requires for optimum functioning, helping to keep you fighting fit!

What are anti-oxidants?

Anti-oxidants are compounds which protect the body from highly reactive molecules known as free radicals, which the body produces naturally during exercise. Anti-oxidant vitamins found naturally in our diet include vitamins A, C and E. It is important that athletes ensure they regularly eat foods containing these vitamins, especially during periods of intense training and in the run up to an important competition or tournament.

Can I just take a multivitamin and mineral supplement to get all these anti-oxidants?

NO, megadoses of some vitamins and minerals are toxic; therefore supplements are NOT the answer! A healthy balanced diet containing a variety of fruit and vegetables is a far better approach to ensure that children and adolescents involved in sport have adequate intakes of essential vitamins and minerals.

Follow our handy guide on which foods contain these anti-oxidant vitamins to guarantee you achieve your recommended intakes.

Vitamin C (ascorbic acid)

The richest sources of vitamin C include citrus fruits such as oranges, lemons, grapefruit (as well as their juices), strawberries, blackcurrants, watermelon, tomatoes, potatoes, green peppers and green leafy vegetables such as broccoli, cabbage and lettuce.

Getting children to eat fruit and vegetables on a daily basis can be challenging, however the key is to try as many as possible to determine their likes and dislikes. Once you find out which fruits and vegetables are favourites you can ensure they are included as part of their diet by trying out different ways to serve them.

Try out some of these quick and easy vitamin C meals and snacks for top results:

- **Fruit salad:** made with 1 orange, 2 kiwis, strawberries and 100mls orange juice can make a healthy breakfast, dessert or after school snack. If your child doesn't like the taste or texture of fresh fruit or you don't always have time to prepare fresh fruit, pots or small tins of fruit in **natural juice** as opposed to syrup can be just as healthy.
- **Fruit smoothies** made with lots of fruit, added milk and natural yoghurt are a great way to cram in all the goodness of fruit and are usually a hit with children.
- A glass of **orange** and/or **grapefruit juice** served with any meal will boost vitamin C levels and makes a great carbohydrate rich snack.
- **Clementines, mandarins and tangerines** make a great addition to any lunchbox. Try peeling before serving to make eating them easier, and where possible choose varieties without seeds as many children dislike fruit because it has pips.
- **Strawberries** with **natural yoghurt** can make a healthy dessert or for an alternative breakfast add some muesli for a carbohydrate boost on the day of training or competition.
- **Don't overcook** broccoli or cabbage, as it will lose its colour, texture and taste. Keeping the bite in will make them more appetising to taste buds!
- If your child doesn't like boiled or steamed vegetables try cutting up **raw vegetables** (such as **broccoli florets, red and green peppers, carrots, mange tout**) and serve with a healthy dip such as **natural yoghurt** with chives/ a squeeze of lemon or lime to encourage them to fill up with goodness.

Vitamin A

Vitamin A can be consumed from animal and plant sources so don't panic if your child doesn't like some sources of vitamin A. There are lots of ways to include it in the diet. Animal sources of vitamin A include: milk, liver, egg yolks, and fish liver oils. However, milk and eggs are the most likely sources for children and are extremely versatile. In general, plant sources of vitamin A include any fruit or vegetable that is highly coloured either, red, orange, yellow or green. For example:

- **Oranges** (see top tips in previous section)
- **Carrots** (boiled/mashed with parsnip/ roasted/ added to casseroles)
- **Red peppers, tomatoes** and tomato products, which are great for salads or disguised in bolognaise, casseroles and sauces
- **Watermelon, mango**, (add to smoothies/ fruit salad or eaten dry as a sweet treat)
- **Sweet potato and pumpkin**, (boiled and mashed / roasted with herbs or a touch of honey)
- **Leafy greens**, (add to sandwiches)
- **Apricots**, either fresh or dried can be added to lunchboxes as a nutritious snack

As you can see some sources of vitamin A are also good sources of vitamin C so it is easier than you think to get all the anti-oxidants you need to improve your sporting performance.

Word of caution: Megadoses of vitamin A are toxic and can have fatal consequences. Children may be at greater risk of toxicity therefore dietary supplements containing high amounts of vitamin A are not recommended. Adequate intake can and should be achieved through food.

Vitamin E

Vitamin E is widely distributed in plant and animal foods therefore it is very easy to achieve adequate intake to aid immune function. Plant sources include healthy nuts, oils and seeds. For example:

- Sunflower, corn and palm oil can be used in moderate amounts whilst cooking and baking instead of lard/butter to increase vitamin E content.
- Products made from these oils such as polyunsaturated margarine, mayonnaise and salad dressings will also contain vitamin E and should feature in the diet.
- Almonds, hazelnuts, peanuts (non salted) and sunflower seeds are examples of vitamin E rich snacks and can be eaten during the day.
- Meat, poultry and fish contain small amounts of vitamin E, however plant sources make a bigger contribution in the diet.

After reading this information you should have an understanding of the importance of carbohydrate, protein, fluid and anti-oxidants in an athlete's diet. If you have any further questions regarding any of the information covered here, please log on to the nutrition forum at www.podium4sport.co.uk and our nutritionist Andrea McNeilly will be happy to answer any further questions which you may have.

Sources used in the preparation of this text include:

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