

NUTRITIONAL GUIDELINES
FOR
FOOTBALL REFEREEES

Written by

DON MACLAREN

INTRODUCTION

The aim of this booklet is to provide football referees with key advice and helpful suggestions regarding nutritional support. As you are aware, quality training leads to improvements in your fitness. However in order to maximise training, there is a need to ensure that serious attention is given to nutrition. This is because nutrition provides the fuel to train properly, the fluid to prevent dehydration and overheating, the micronutrients for health and well-being, the building blocks for enhancing muscle recovery and size (if you need to), and the supplements to aid these processes. Each of these areas are addressed in this text.

CONTENTS

- 1. Code of conduct for referees**
- 2. Fatigue, nutrition and football**
- 3. The Macronutrients – carbohydrate, fat, and protein**
- 4. The Glycaemic Index (GI)**
- 5. Fluids**
- 6. Breakfast**
- 7. Lunch**
- 8. Dinner**
- 9. Supper**
- 10. Snacks**
- 11. Pre-match meal**
- 12. Post-match meal**
- 13. Training days**
- 14. Recovery Days**
- 15. Guidelines for Pres-Season**
- 16. Guidelines for Off-Season**
- 17. How to use supplements**
- 18. How to use caffeine**
- 19. How to use creatine**
- 20. How to use glutamine**

NUTRITIONAL CODE OF CONDUCT for REFEREES

Nutrition plays two fundamental roles for referees:-

1. *Sound nutritional practices are essential for the good health of all referees. In order to achieve this referees must:-*

- consume a varied diet of foods to ensure adequate amounts of carbohydrates, fat, protein, minerals, and vitamins are eaten.
- eat foods in line with the recommendations provided in this document.
- take advice on supplements as provided in this document. Such supplements include those for enhancing immune function, reducing body fat, enhancing recovery, and promoting increases in muscle tissue.
- undertake regular medical screening to ensure normal liver, kidney and immune functions, a normal blood lipid profile, and normal iron status. Appropriate nutritional interventions could help if any of the above tests are abnormal.
- drink at least 2 litres of water a day in addition to other beverages.
- avoid alcohol, or at the very least ingest small quantities when appropriate.

2. Sound nutritional practices are essential for proper training to be undertaken and for good match performances. In order to achieve this, referees must:-

- eat a breakfast containing carbohydrates and some protein before training.
- drink carbohydrate drinks or water during training sessions
- drink the carbohydrate and protein drinks for recovery after training where appropriate.
- eat a sensible carbohydrate-based meal at lunchtime. Drink plenty of water during lunch too.
- eat a sensible dinner containing carbohydrates based on vegetables, salad and fruit as well as good amounts of quality protein meat and fish.
- ensure that dinner is not eaten later than 7.30 pm on most nights.
- not eat a large supper, although a light supper may be eaten before bed if body fat is within acceptable limits.
- attempt to eat snacks based on fruit, yoghurt, and salads rather than sweets, biscuits, chocolates, and cake.
- ensure that pre-match meals taken at home are similar to those provided in hotels when playing away i.e. low in fat, high in carbohydrates, and reasonable amounts of protein. This meal must be eaten no later than 3 to 3.5 hours before the match.
- ensure that post-match meals are high in carbohydrate (i.e. 2 g for every kg of a referees body weight) and have some protein. This must be consumed within 2 hours after the

match. Drinking Precision Carbohydrate and Myoplex (or their alternates) are strongly advised.

- make themselves familiar with this 'Nutrition' booklet and ask advice if any concerns arise.

FATIGUE, NUTRITION and FOOTBALL

Fatigue is an inevitable consequence of participating in any sport, and training and correct nutritional practices can help to ensure that fatigue occurs later rather than sooner. From a nutritional perspective, the following are known to result in fatigue:-

- 1. Depletion of muscle glycogen stores** – it has been known for at least 30 years that when muscle glycogen stores become depleted the ability to engage in intense bouts of exercise is not possible. This is because muscle glycogen is a fuel necessary for muscles to work at intensities greater than 50% of maximum. Fats on their own cannot be used as energy stores for intense exercise bouts. It is imperative that referees have sufficient muscle glycogen levels at the start of a match, and that they eat and/or drink some carbohydrate during the match/training.
- 2. Low blood glucose (hypoglycaemia)** – it has been known for at least 70 years that when blood glucose levels are low, the ability to exercise is reduced. More recently, it has become clear that maintenance of blood glucose is essential for the brain to function properly. Since the role of refereeing demands decision making skills, a reduced blood glucose level from low liver glycogen content will invariably lead to slower times for reactions and decisions. It is imperative that referees have sufficient liver glycogen levels at the start of a match/training, and that they eat and/or drink some carbohydrate during the match/training.
- 3. Dehydration** – sweating is a normal response in training and match play. The inevitable result is that the body loses water and body temperature becomes elevated. Loss of body water causes dehydration, and this leads to impaired physical and mental performance. It is imperative that referees are well hydrated before a match, and continue to drink fluids at opportunities during the match.

The Macronutrients

Carbohydrates

There are several important functions about carbohydrates:-

1. **Energy Source** – Provides the energy for high intense activity. Energy comes from the breakdown of glucose from the blood and glycogen in muscle.
2. **Protein Sparing** – Sufficient carbohydrate intake can help to stop muscle tissue protein breakdown. The main role of protein in the body is for maintenance, repair and growth of body tissue. When the carbohydrate levels in the body become depleted through prolonged exercise or insufficient carbohydrate in the diet, protein is used as a source of energy.
3. **Fuel for the Brain** – carbohydrate is essential for the proper functioning of the brain. Blood glucose is the only fuel used by the brain. So when blood glucose levels are low (hypoglycaemia), the brain does not work as well as it should. Decisions and skill are impaired, and fatigue will happen.

Fats

Although the fat intake of a referee should not be high, fats are needed in the diet and have many essential functions in the body such as: -

1. **Energy Source** - Fats are the major energy reserve in the body, and the major source of energy for low intensity activity.
2. **Protection and insulation** -Fats act as a protective shield against trauma to vital organs such as the heart, liver, kidneys, spleen, brain and the spinal cord.
3. **Cell membranes** - Fats are a major part of all cell membranes including nerves and brain cells.
4. **Vitamin carrier, and fat and cholesterol transporter** - Fat serves as a carrier for the fat soluble vitamins – A, D, E, and

K. They also help in the transport of fats and cholesterol in the blood.

5. **Hunger depression** - Fats in the diet delay the onset of 'hunger pangs' and contribute to feeling of fullness after a meal. This is because fat empties from the stomach slowly.

Protein

Protein is an essential macronutrient within the body and performs many important roles concerning structure and function. These roles include: -

1. **Structure** - Building material for bone, ligaments, tendons, and muscles are protein.
2. **Enzymes** - All enzymes are proteins. Enzymes regulate many energy producing reactions, as well as the building and repair of tissues, especially muscle.
3. **Hormones** - Hormones such as insulin and adrenaline are proteins and are important in controlling exercise metabolism.
4. **Blood Transport** - Protein is required in the body for the synthesis of the many blood transport proteins such as haemoglobin and albumin.
5. **Energy** - Proteins can act as an energy source after the depletion of carbohydrate following exercise.

The Glycaemic Index (GI)

Traditionally carbohydrate-containing foods have been classified as simple or complex. In this instance, foods which are high in simple carbohydrates include glucose, sugar, fruit, jams, sweets and confectionery products, whereas complex carbohydrates include foods high in starch, such as bread, pasta, potato, and rice. More recently, the glycaemic index (GI) has been used to categorise foods according to their ability to raise blood glucose. Since all carbohydrate-containing foods raise blood glucose levels following digestion and absorption, the GI is a useful way of ranking composite and simple carbohydrate sources based on this ability.

Selected foods categorised on their GI values.

Low GI foods		Moderate GI foods		High GI foods	
Food	GI	Food	GI	Food	GI
Fructose	23	Sucrose	65	Glucose	100
All-Bran	42	Muesli	68	Cornflakes	84
Apple	36	Mango	55	Watermelon	72
Pear	36	Banana	53	Pineapple	66
Pasta	41	Rice	56	Bread	70
Chocolate	49	Popcorn	55	Jelly beans	80
Peanuts	14	Crisps	54	Corn chips	73
Apple juice	41	Orange juice	57	Sports drinks	95
Yoghurt	33	Ice cream	61	Baked potato	83

When to use foods of varying GI?

1. The pre-training/pre-match meal should be high in carbohydrates with a low-GI **IF** referees are sensitive to small decreases in blood glucose in the first 10-15 minutes.
2. Drinks with a moderate to high-GI are of greatest benefit during training or a match.
3. Drinks or food with a high-GI are essential in the early stages of recovery from training/match.

4. Drinks or food with a high-GI should normally be avoided at night unless the day before or the day of a game.

FLUIDS

Prevention of dehydration

1. The loss of body fluids from sweating causes fatigue, and so referees must take on board enough fluids during games and training.
2. The rule of thumb is 'little and often'. Drinking around 200 mls (a paper cup full) every 15-20 minutes is recommended.
3. Drinking about 500 ml of fluid in the hour before a match/training is required.
4. Drinking fluids during half-time is also strongly advised.
5. Ideally referees should drink 2 litres of water (I suggest Penta water) the day before a game.

What should the drink contain?

1. In hot conditions just water should be ingested. This is because the addition of carbohydrates tends to slow down the rate at which water gets into the blood. The more concentrated the carbohydrate drink, the slower the rate of delivery of water to the blood.
2. Drink a low carbohydrate drink in the early stages (say 40-45 minutes), followed by a normal carbohydrate sports drink at half-time and in the last 20 minutes.

Rehydration

1. Dehydration from sweat loss is inevitable during strenuous exercise, whether in the heat or not. This is because more fluids is lost through sweating than can be taken by drinking i.e. sweat rates of 1.5-2 litres an hour are not uncommon, whereas drinking more than 1 litre an hour is difficult to achieve.
2. Referees must rehydrate adequately afterwards.
3. A useful guide to see how much body fluid is lost in training or a match is to weigh yourself (nude and dry) before and afterwards. The weight loss in kg is equal to water loss from sweat in litres i.e. 0.5 kg loss = 500 mls water lost.

4. Drink fluid after training/match at least 150% (1.5 times) the body weight loss i.e. if 1 kg of body weight is lost through sweat, drink 1.5 litres of fluid.
5. The drink must contain sodium (normally in the form of salt). The recommendation is around 0.7-1.2 g in a litre.
6. Carbohydrates drinks do not make a difference to rehydration after exercise.
7. Food eaten with water helps to rehydrate, because the food contains water and salt.
8. Many of the 'soft' drinks (e.g. coke) contain no (or too little) salt, and are not useful for rehydration.
9. Drink as soon as possible after exercise since body fluid recovery takes at least 30 minutes. However because drinking fluids inevitably leads to urine production and elimination, actual rehydration may not be complete for 4-6 hours.

Penta Water

There is evidence that Penta water may help rehydrate players more quickly than other bottled water, and that Penta also helps hydrate more effectively when drunk before and during training/games.

BREAKFAST

Eat breakfast like a King

This means that breakfast **MUST** be considered as the most important meal of the day. For referees this is not quite true **BUT** it is a very important meal which helps you to repay what the body has used during sleep and to 'fuel-up' before morning training. The emphasis should be on carbohydrates, protein, and fluid.

You are strongly advised to select from the following menu:-

Breakfast items 1 to 2 hours before training

Poached or Scrambled egg (2-3 whites:1 yolk)

Lean ham

Grilled tomato and grilled/boiled mushrooms

Baked beans

Cereals with skimmed milk

Fresh fruit salad and yoghurt

Fruit juices - orange/apple/pineapple

Toast and preserves

Breakfast items 45 minutes to 1 hour before training

Cereal with skimmed milk

Fresh fruit salad and yoghurt

Fruit juices - orange/apple/pineapple

Toast and preserves

Whey Protein supplement

LUNCH

Eat lunch like a prince

Since this meal is normally after a morning training session, it is important to re-fuel with carbohydrates, enhance muscle structure and recovery with protein, and rehydrate with fluids. This meal **MUST** be eaten within 1 hour of finishing training and contain quick release carbohydrates as well as protein. If an afternoon session follows this meal then eating vegetables or salad is less important, and eating too much can be a problem.

Starters (If eaten)

Soup + roll
Fresh fruit salad

Main Course

Grilled chicken/turkey/beef strips/fish (medium portion)
Rice/pasta/potatoes (large portion)
Steamed or boiled vegetables or salad (medium –small portion)

Dessert

Fresh fruit

Drinks

Water/ fruit juice or squash/ low carb. Sports drink

Eat the above in good-sized amounts when players have finished training and have NO afternoon session. Drink a high carb. Sports drink if not hungry and eat less.

Eat the above in smaller portions if there is an afternoon session.

DINNER

Eat dinner like a pauper

Referees should be careful about what they eat for this meal. This means not eating too much and not eating **TOO LATE AT NIGHT** (no later than 7.30 pm). It is a time to continue to 'fuel up', but using 'slow releasing' carbohydrates. So, eat more vegetables and salad, and less potato, rice, bread, and pasta compared with lunch.

Starters (If eaten)

Soup (no roll)

Fresh fruit (e.g. melon)

Bowl of salad (with pate/grilled chicken pieces/smoked salmon)

Main Course

Fish/chicken/turkey/lean steak/pork fillet (large portion)

Rice/pasta/potatoes (small portion)

Steamed or boiled vegetables or salad (large portion)

Dessert

Fresh fruit

SMALL amount of fruit pie/ fruit crumble and custard

SMALL piece of cake

Drinks

Water/ fruit juice or squash/ tea/coffee

SUPPER

What you eat in the evening is usually a key factor in body weight control. Too much food at night (if there is no training or match) or the wrong type of food can lead to increases in body fat. This is unacceptable for an elite referee and so must be addressed. Having supper around 9 or 10pm is okay if you have eaten your dinner at 6-7pm and start to feel hungry – or if you are hungry just before bedtime.

Having a bowl of cereal or a couple of slices of toast sometime after dinner or just before bed **is okay on the night before a match or the night of a match, but not normally okay on other nights**. It is preferable that on all other occasions referees keep away from quick release or high GI foods. This means avoiding bread and cereal (and also potatoes, rice, and sugary drinks – including sports drinks).

As a bedtime drink you should have a cup of warm milk or casein (a type of protein which is slow release) if in training or recovering from a match.

Snacks to eat for supper or to stop hunger at 9-10pm could include:-

Small bowl of salad – either on its own or with chicken breast or sliced ham or tuna or a boiled egg.

Couple of slices of Ryvita (multigrain is good) with sliced ham and tomato.

Natural yoghurt (low fat) and add fruit slices if you wish.

Fresh fruit (though try and avoid pineapple or ripe bananas).

A few plain nuts (unsalted).

Small bowl of All Bran with skimmed milk.

Small bowl of porridge with skimmed milk.

The foods you must avoid are other cereals, toast or sandwiches, sweets, chocolates, cakes, fizzy drinks, crisps, and dried fruit such as raisins.

SNACKS

Snacks play an important role in the nutrition of referees, and so careful attention should be given as to what to eat as snacks at varying times during a day. After training, snacks can be useful to fill a gap until a meal is eaten – these snacks should contain high GI carbohydrates and some protein. In the evening, a snack will fill a hunger gap before bed – these snacks should be low GI but have some protein. If there is a need to increase body weight, nutritious snacks can help. Ideas for types of snack are:-

Post-training

Dried fruit (raisins, apricots etc)
Fresh fruit (bananas and pineapple are good)
Cereals
Sandwiches/baguettes/bagels
Pizzas with little or no cheese
Malt loaf (Soreen)
Low fat cakes and biscuits
Mixed nuts and raisins
Sports drink or fresh fruit juice
Precision Carbohydrate
Whey Protein/milk shake/Smoothie

Evening snacks

As suggested on the previous page

Snacks for weight gain

Dried fruit and mixed (unsalted) nuts
Breast of chicken/slices of ham or turkey or beef or pork
Meat or tuna salad wholemeal/wholegrain sandwiches
Malt loaf
Whey Protein/milk shake/Smoothie

PRE-MATCH MEAL

The pre-match meal should be eaten approx. 3.5 hours before kick-off. Therefore, if kick-off is 3.00 pm the pre-match meal should be served for 11.30 am. Selecting from the following items will be required for the pre-match meal: -

Starters

Chicken soup + Roll (Wholemeal)
Chilled Melon + mixed berries

Main Courses

Chicken slices griddled with a little olive oil
Baked Salmon
Thin beef slices griddled with a little olive oil
Freshly cooked pasta or boiled rice
Poached/scrambled eggs on extra thick toast (3-4 slices)
Baked beans on extra thick toast or jacket potato
Wholemeal Baguette with Ham and salad

Also:

New potatoes
Broccoli/carrots/cauliflower/green beans/peas
Variety of mixed salad tossed with olive oil or vinaigrette
Wholemeal Bread (fresh and toasted)
Crusty Wholemeal rolls

Dessert

Fresh fruit salad
Low fat yoghurt

Drinks

Water
Pure Fresh fruit Juice
Sports Drink (Precision Carbohydrate)

POST-MATCH NUTRITION

The emphasis for this crucial meal is to add to the supplements you are drinking by eating a high carbohydrate meal with some quality protein, and to get fluids on board. The order of refuelling/restocking is:-

Carbohydrate/Water → Protein

The timing of this is Carbohydrate+Water in the 1st 30-60 min with follow up in the next two hours. Protein within 2 hours. These can be eaten or drunk.

In the Changing Room

Sandwiches, hot baguettes, pizzas, malt loaf, bananas, dried fruit

**Precision Carbohydrate/Sports drink
Whey Protein/Precision Protein/Myoplex**

The post-match meal (i.e. after changing) is as follows:-

Starters

A soup with wholemeal rolls (no butter)

Main Course

ALL meals to have a selection of steamed vegetables i.e. 4 choices from broccoli, cauliflower, carrot, green beans, peas, baby corn, mange tout, sugar snaps, courgettes.

ALL meals to have two types of sauce for the pasta – one being a tomato based sauce.

Meal 1 – Plain griddled chicken breast strips with pasta and rice.

Spaghetti bolognaise (low fat mince or chicken mince)

Meal 2 – Piri Piri chicken breast strips with pasta and rice.

Roast ham with boiled new potatoes.

Meal 3 - Lemon pepper chicken breast strips with pasta and rice.

Roast turkey with boiled new potatoes.

Meal 4 - Cajun chicken breast strips with pasta and rice.

Roast beef with boiled new potatoes and mashed potato.

Meal 5 – Tandoori chicken breast strips with pasta and rice.

Roast gammon with boiled new potatoes.

Meal 6 - Chicken lasagne made with as low fat content as possible i.e

lots of pasta and chicken.

Oriental honeyed pork with rice.

Meal 7 – Deep pan pizza with no cheese. Topping to include spicy

chicken with mushrooms and peppers.

Tuna pasta bake.

Desserts

fresh fruit available at all meals;
emphasis on high carbohydrate and low fat;
examples:-

apple crumble and custard,
meringue nests with fruit and ice cream,
fresh fruit salad,
various types of sponge with custard.

Drinks

500 ml Penta water
Fresh fruit juices of choice

THESE FOODS CAN ALSO BE EATEN AT LUNCH TIME

TRAINING DAYS

1 TRAINING SESSION A DAY	2 TRAINING SESSIONS A DAY
Breakfast 90 minutes before training Include cereal/toast/scrambled eggs/baked beans/fresh fruit juice/yoghurt	Breakfast 90 minutes before training AND Protein shake 1 hour before training
10.30am TRAINING	10.30am TRAINING
LUNCH Can eat larger portions and have fair portions of vegetables/salad Take creatine with this meal	LUNCH Good time to take creatine with this meal
	2/2.30pm TRAINING
Mid afternoon snack (see snack list)	Straight after training drink high Carb drink Within 1 hour have Protein shake Drink water and eat snacks

<p style="text-align: center;">DINNER</p> <p>This meal should be large on protein portions and vegetables (not potato or sweetcorn) and salad but low (or no) pasta/potato/rice/bread Drink water not fruit juice</p>	<p style="text-align: center;">DINNER</p> <p>This meal should be large on protein portions and vegetables (not potato or sweetcorn) and salad but low (or no) pasta/potato/rice/bread Drink water not fruit juice</p>
<p style="text-align: center;">POST-DINNER SNACKS</p> <p>Try not to eat unless need to bulk up NO high GI carbs – you can eat low fat yoghurt with fruit (tho’ not banana or pineapple), some unsalted nuts, or even a tuna/chicken salad</p>	<p style="text-align: center;">POST-DINNER SNACKS</p> <p>Try not to eat unless need to bulk up NO high GI carbs – you can eat low fat yoghurt with fruit (tho’ not banana or pineapple), some unsalted nuts, or even a tuna/chicken salad</p>
<p style="text-align: center;">BEDTIME SUPPLEMENT</p> <p style="text-align: center;">Casein protein</p>	<p style="text-align: center;">BEDTIME SUPPLEMENT</p> <p style="text-align: center;">Casein protein</p>

RECOVERY DAYS

For some referees, the day after a game is one in which they feel very tired and not particularly hungry. For others there is a feeling that a recovery day is one in which there is little activity and so little food should be eaten.

Please remember that the day after a game is an ideal time to refuel the low levels of muscle carbohydrates by eating (especially in the morning and early afternoon) toast, cereal, pasta, rice, potatoes, and bread. If not hungry then there is a need to drink carbohydrate drinks e.g. take two bottles of Precision Carbohydrate (one at breakfast and one at lunch) with meals.

The muscle has been put through a punishing time and needs to physically recover. This requires energy (from carbohydrate) as well as protein to rebuild itself. So Protein intake must not be compromised. Have scrambled eggs and bacon for breakfast. Eat yoghurt and fresh fruit or mixed nuts and dried fruit as snacks. Eat meat and/or fish at lunch and dinner. Drink one whey protein drink in the day.

The body may be dehydrated – what does your pee colour suggest. Make sure you drink 2 litres of water in addition to fruit juice, tea, and coffee etc.

So, a recovery day is just what it states i.e. an opportunity for your muscle to recover (with protein), your fuel stores to recover (with carbohydrate), and your fluid levels to recover (with water/fluids).

GUIDELINES FOR PRE-SEASON

Pre-season training is a crucial period for referees to become ready for the oncoming season. It is a period where fitness is worked on, and so it is vital to be mentally alert and physically ready. Sound nutrition is an absolute requirement to help fuel the brain and the muscles, and this will allow you to maximise your efforts. The following points are just to focus your mind on some important nutritional factors:-

1. Since carbohydrates are the major fuel for muscles and your brain, make sure you **'think carbohydrates'**. This means eating carbohydrates for breakfast, drinking carbohydrate drinks during and after training, and eating carbohydrates for lunch and for dinner.
2. Your carbohydrate foods should be cereal, toast and fruit for breakfast. Drinking 200 ml of a carbohydrate drink every 20 minutes during training. Drinking up to 500 ml of carbohydrate drink after training. Eating pasta/rice/potatoes/bread as well as salad/vegetables/fruit for lunch and dinner.
3. Your muscles are made up of protein and this will break down during training, so make sure you eat or drink protein before and after training. **Pre-season is a time when extra protein is necessary.** Eat eggs, ham/lean bacon, and/or baked beans for breakfast. Drink milk or milk shakes or smoothies as snacks. Drink Myoplex 1 hour before and within 1 hour after training. Eat meat or fish in large amounts for dinner. Eating red meat (i.e. steak, beef, lamb) is important for keeping iron levels high in your body - eat this type of meat on 2 or 3 times a week. You might even consider having a drink of skimmed milk before bedtime.
4. **Drink plenty of fluids.** You need to take at least 3 litres of fluid a day above the coffee or tea or fruit juice you normally drink. Check the colour of your urine - if it is very yellow, you are not drinking enough. Your urine colour should be pale yellow or clear.
5. Check your body weight every morning. A decrease in body weight could mean you are dehydrating or not eating enough. An increase in weight could mean you are eating too much or that you are putting on muscle.
6. Variety is the spice of life. Eat a variety of fruit and vegetables for health, good immune function, and to aid recovery.

7. Be wary of alcohol!! This can lead to dehydration and increases in fat stores.

GUIDELINES FOR OFF-SEASON

After a hard season all you want to do is go and have a nice restful holiday – eat, drink, and be merry!! The off-season is an essential part of recovery, a great time to re-charge the batteries, and important quality time with family and friends. The only problem is that if a referee ‘lets himself go’, the consequences are a very tough pre-season training period to undo all the poor habits you have taken on board in just a few weeks. So what do you do?

1. Better to have a holiday (with any bad habits!!) in the first 2-3 weeks off so that you get back to some better habits leading up to pre-season.
2. Where and when possible watch what and how much you eat and drink in the evenings. If possible stick to the high protein and high salad/vegetable meals at this time.
3. Be wary about eating high GI carbohydrates too often in the evenings.
4. Keep well hydrated. Check your morning urine colour.
5. Engage in some exercise every day.
6. Check your body weight regularly to make sure you don't really let yourself go too much.

HOW TO USE SUPPLEMENTS

The following are some key points about how to take supplements which may be of some specific benefit:-

Protein

There are two types of protein available – Whey Protein and Casein.

Whey Protein has a fast release of amino acids and is the drink to take 1 hour before your morning session and 1 hour before a match. It should also be taken after the second training session in the afternoon.

Casein is the bedtime protein because it provides a slow release of amino acids.

Precision Carbohydrate (EAS product)

This is a high carbohydrate-providing recovery drink. It has 100g of carbohydrate and should be taken within 30 minutes after a match and after any training session where it is not possible to eat or drink enough carbs i.e. maybe after an afternoon session before going home.

Creatine/HMB/Betagen (EAS product)

Never take Creatine or HMB if you are taking Betagen, since Betagen contains both creatine and HMB.

Normal daily intake of creatine should be about 3-5g a day (so Betagen intake must be modified to take that amount of creatine). This must be taken with a high carb drink or high carb meal. So this means either having it at lunch with your pasta/rice meal (preferably) or with Precision Carbohydrate drink (maybe after the afternoon training).

If you have been off creatine for a month or more, then loading with creatine can be done over 5 days with four 5g doses a day taken at breakfast, lunch, mid-afternoon, and evening (with carb

meals/drinks). When you do this you MUST drink plenty of fluid throughout these days.

Caffeine/CLA/Carnitine

These supplements, either singly or in combination, are used for 'fat burning' and as such should be taken 1 hour before an aerobic session. During the session make sure you only drink water NOT carbohydrates.

Multivitamins

If you wish, you may take a multivitamin tablet at breakfast. Do not exceed the dose because you can overdose on vitamin A if you take too much (and especially if you are also on antioxidants which may also contain vitaminA).

Antioxidants

When a person exercises, free radicals are formed from the extra oxygen taken in. These free radicals cause damage to cells. Antioxidants help to 'quench' free radicals and so may be useful to protect muscle cells during and in recovery from training. The best known nutritional antioxidants are vitamins A, C, and E and the mineral, selenium.

Glucosamine and Chondroitin

These tablets are beneficial for joints and should be taken (if needed) as per manufacturers' instructions.

Glutamine

Glutamine is an amino acid of great significance in the body for a number of reasons. It may help muscle to recover from training faster, it may help to boost muscle carb stores after training when taken with carbs, and may enhance immune function during periods of heavy training as well as during winter months when colds, flu etc are prevalent.

HOW TO USE CAFFEINE

Rationale

Caffeine is a natural food substance found in products such as coffee, tea, chocolates, coca cola, and some over the counter diuretics. The IOC lifted the ban on caffeine from 1st January 2004 due to the fact that the ergogenic properties of caffeine arise from ingested amounts of 5-6mg/kg body mass, and these do not result in urine levels being above the limit (and indeed amounts of caffeine above 5-mg/kg body mass fail to enhance performance any further). Research findings have clearly demonstrated over the years that supplementation with caffeine leads to an improvement in endurance and sprint performance. Indeed, studies in the Sports Science laboratories at Liverpool John Moores University have established that caffeine ingestion significantly enhances performance in games lasting 90 minutes or so – both the ability to sustain sprinting and for overall endurance.

Caffeine stimulates mental alertness, which is an important aspect of refereeing– particularly in the later stages of a game, and also conserves muscle glycogen stores by enhancing fat use. Since muscle glycogen is a key factor concerned with fatigue, the use of

caffeine should be considered to spare these limited stores – particularly when there is more than 1 game per week.

The well-known fat burning effects of caffeine may be employed in situations where players need to reduce body fat stores. In this case caffeine ingestion should take place before appropriate training sessions.

Safety

1. Concerns have been expressed with regard to the diuretic properties of caffeine and possible dehydration. This is NOT observed in an exercise context.
2. Caffeine overdose can lead to hospitalisation, so make sure you know what and how much you are taking.

Caffeine Ingestion

1. 'Pure quality' caffeine MUST be used or products containing caffeine must be vetted. Examples of products include ProPlus, Ripped Fuel, or Red Bull sugar free.
2. No more than 5 - 6 mg/kg body mass of caffeine should be ingested in the hour before a match or training.
3. Referees should refrain from caffeine-containing products in the 12-24 hours before caffeine is to be ingested (if possible) for maximal effects.
4. Referees must consult with the sports science and medical staff before taking caffeine products.

5. The use of caffeine will only be considered in cases where there is (a) a need to spare muscle glycogen due to close proximity of matches, and (b) a need to 'fat burn'.

HOW TO USE CREATINE

Rationale

Creatine is a natural food substance found in meat and fish since it is found in muscle. Consequently it is also found in human muscle and provides an important energy source during high intensity bouts of exercise such as sprinting, jumping, throwing, and diving - all important aspects in a game of rugby. Research findings have clearly demonstrated over the years that supplementation with creatine in combination with carbohydrate leads to an increase in muscle stores of total creatine. Furthermore, most appropriate and well-designed studies have also demonstrated subsequent improvements in muscle strength, power, and the ability to perform multiple sprints. Since the game of football demands strength, power, and the ability to sustain sprinting ability, creatine supplementation may well be of significant benefit at appropriate periods of a training cycle.

Creatine supplementation also leads to increases in lean body mass when taken in combination with resistance and power training over a period of weeks. Whereas the initial increase is concerned with elevated intra-muscular water, the later changes are due to greater lean body tissue. Such an increase in muscle mass may be of significance to those referees who need to 'bulk up'.

In the last 12-18 months a number of important research papers have highlighted the value of taking creatine with carbohydrates after intense bouts of exercise with a view to more rapidly restoring muscle glycogen. These studies have clearly demonstrated that 5-10g of creatine taken with 100-200g of carbohydrate will restore muscle glycogen 20-30% faster than just carbohydrates in 24 and 48 hours after exercise. This would be invaluable for referees who have only 2-4 days of rest between games/training.

Safety

Creatine is NOT a substance banned by the IOC because it is a natural nutritional food made from amino acids. However, concerns have been expressed with regard to the dose and kidney function. The following guidelines should ensure no adverse health problems:-

1. A normal liver and kidney function test must be present.
2. The 'loading' phase only lasts for 5-6 days before the 'maintenance'

phase.

3. Referees are advised to consume plenty of fluids during the 'loading' phase and adequate intakes thereafter.

Creatine Ingestion

1. 'Pure quality' creatine monohydrate **MUST** be used.
2. Normal liver and kidney function tests **MUST** be shown by the medical staff.
3. The 'loading' phase results in taking three 6.6 g scoops a day for between 5 and 6 days **ONLY**. Alternatively four 5 g portions are to be taken each day for 5 - 6 days.
4. A carbohydrate meal or drink **MUST** precede the ingestion of creatine
 - preferably 15 to 30 minutes beforehand.
5. At least an extra 1 litre of fluid a day is taken during the 'loading' phase. This may be achieved by mixing the creatine in either 330 mls (if 3 x 6.6 g/day) or 250 mls (if 4 x 5 g/day) of fruit juice or squash.
6. No more than 3 - 4 g/day of creatine should be ingested in the 'maintenance' phase. This phase can last for weeks or months during appropriate training.
7. If supplementation is for a long period (i.e. longer than 3 months) then medical staff will undertake further liver and kidney function tests.

HOW TO USE GLUTAMINE

Rationale

Glutamine is a naturally occurring amino acid found in all protein-containing foods and drinks. Although not an essential amino acid it nonetheless is reported to play an important role as a nutrient for cells of the immune system. Low levels of glutamine may result in impaired immune function with the consequences of more illnesses and infections such as colds, flu, and upper respiratory tract infections. Furthermore glutamine, in combination with carbohydrates such as glucose, has been reported to promote glycogen storage in muscle after exercise. Research findings have been equivocal in both these respects, although on balance glutamine ingestion should be considered during strenuous periods of training and especially during winter months.

Safety

There are no real safety issues concerning glutamine ingestion, although taking too much is not advocated.

Glutamine Ingestion

1. 'Pure quality' glutamine MUST be used.
2. Approximately 5 - 10 g/day of glutamine should be ingested at lunchtime after training and after a match.

