

The Top Ten Nutritional Mistakes Made by Elite Athletes

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“The sole purpose of life may be simply to serve as a warning to others” Anonymous



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Over the last 10 years, the authors have spent a lot of time working with elite athletes from a variety of sports, including rugby (league and union), golf, rowing, cycling, athletics, football and boxing. James Morton is currently the performance nutrition consultant for Liverpool FC and several professional boxers, whilst Graeme Close is the performance nutrition consultant for Munster RUFC and advises several professional rugby league teams. One of our major roles is to educate the athlete and attempt to correct dietary mistakes. This article will take a look at the ten most common nutritional mistakes made by elite athletes, (in the opinion of the authors), and provide practical advice on how to correct or avoid these potential nutritional disasters.

Sometimes, the advice will be rooted in fundamental science and other times the advice comes from practical experience. These mistakes are in no particular order - except for number 1!

1. Skipping breakfast



THE PROBLEM - Many athletes do not eat a breakfast, commonly due to a range of reasons, including lack of time, not feeling like eating in the morning, the misconception that this is a good way to lose body fat, or simply due to habit. Skipping breakfast is associated with many adverse health effects including increasing body fat levels¹ and it has even been linked to increased chances of cardiovascular disease². Many athletes feel that a cup of coffee is a sufficient breakfast and that they can eat a proper breakfast once they have finished their morning training.



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From an athletic point of view, an overnight fast will result in a major drop in liver glycogen (less than 20g of glycogen compared with approximately 110g). The main role of liver glycogen is to help maintain a constant blood glucose concentration. A steady blood glucose concentration is essential since the brain and central nervous system can only use these for energy. If blood glucose concentrations become too low (less than 3mmol/L), symptoms of hypoglycemia occur including dizziness, nausea, increased heart rate, loss of motor control and an inability to concentrate, with obvious implications on training and performance. This is more likely to occur if liver glycogen stores are low following an overnight fast. Moreover, glycogen broken down in the muscle cannot be released as glucose into the circulation, as muscle lacks the enzyme glucose-6-phosphatase. Therefore, blood glucose concentration must be maintained by another means – this being the glucose-alanine and glucose-glutamine cycles. These cycles involve the muscle releasing the amino acids alanine and glutamine into the blood, where they are transported to the liver for conversion into glucose. Therefore, training after an overnight fast not only induces hypoglycemia thus decreasing athletic performance, but can also result in the body becoming catabolic, resulting in a net loss of lean muscle mass!

THE SOLUTION - To overcome this, it is essential that athletes consume breakfast. This breakfast should ideally consist of low Glycemic Index (GI) carbohydrates and moderate protein and should be consumed approximately 1 hour prior to the training session. If a reduction in body fat is the main aim of the morning training session, then protein should be eaten such as poached eggs or yoghurt and carbohydrates should be avoided until after the training session. This will prevent the loss of lean body mass but still promote fatty acid oxidation and thus, a decrease in body fat.³

2. Chronic dehydration

THE PROBLEM – Many athletes we have worked with demonstrate a consistent level of dehydration as assessed using urine osmolarity. A value of between 100-300 mOsm.kgH₂O would indicate a good level of hydration, although it is not uncommon to observe values around 900 mOsm.kgH₂O and personal observations have observed values of over a 1000 mOsm.kgH₂O in elite rugby players after they have been educated into the importance of hydration. Dehydration can result in reduced blood volume, increased core temperature, increased rate of glycogen oxidation and decreased sweat rate,⁴ all of which can have a major detrimental effect on performance. It has been suggested that a typical fluid loss for a sedentary person (due to respiration, sweating, faeces and urine) in a cool climate is approximately 2.2L



per day. During strenuous exercise many athletes can lose 2-3 additional litres through sweating, even on a cool day.⁵ It should be noted that fatigue towards the end of exercise can be just as much due to dehydration as it can be lack of fuel.

THE SOLUTION – Athletes need to be educated to realise and understand the importance of being hydrated and they must train themselves to increase their fluid intake. We advise our athletes to:

General

1. Drink approximately 500ml of fluid with each meal of the day.
2. Drink an additional 2L throughout the day.
3. Monitor urine colour and odour which should be pale and odourless. However, it is important to be aware that some vitamins, especially B vitamins can give a yellow tinge to urine.

Competition or training

1. Drink 500ml of fluid approximately 2-3 hrs pre-exercise.
2. During exercise, start drinking early and aim to drink 250ml per 15 mins.
3. Make sure the fluids are lower than ambient temperature.
4. If exercise is longer than 60mins, consider adding carbohydrate to the drink (60g/hr in a 6-8% solution).
5. If exercise is longer than 1 hour, consider adding sodium to the drink (0.5g/L).
6. Weigh yourself before and after exercise and for every 1L loss of weight replace with 1.5 times that in fluid (for example if 1Kg loss drink 1.5L of fluid post-exercise).

3. Not understanding the Glycemic Index (GI) of carbohydrates

THE PROBLEM - As discussed in a previous edition of PSAC, athletes are often advised to follow a high carbohydrate diet with figures ranging from 6g-10g per kg body mass often recommended. However, athletes are rarely educated in the different types of carbohydrates and especially the role that the GI plays in the storage and metabolism of these carbohydrates. The GI system involves ranking foods based on their immediate effect on blood glucose, with carbohydrate foods that break down quickly during digestion having the highest GIs.

Data has demonstrated that for general health and to maintain low body fat the predominant source of carbohydrates should be low GI e.g.⁶ This is because there is a greater rate of fat oxidation following the consumption of a low GI meal than a high GI meal. Moreover, there is greater satiety following a low GI meal with athletes reporting feeling full for longer.

A further potential problem for athletes is the risk of rebound hypoglycemia after a high GI meal. Following a high GI meal, there is a sharp increase in blood glucose followed by a subsequent sharp rise in insulin concentration. This lasts for approximately 2 hours. There is then a reactive hypoglycemia, lasting 1-2 hours. If an athlete was to exercise during this reactive hypoglycemia, less fat and more carbohydrate would be oxidized, potentially resulting in premature fatigue, plus the athlete may feel tired and lethargic at the start of the exercise. Consumption of a low GI meal does not result in this reactive hypoglycemia.

High GI carbohydrates are particularly useful for the rapid replacement of muscle glycogen, i.e. post exercise, and as an immediate source of energy i.e. during exercise. High GI carbohydrates also facilitate the uptake of creatine into the muscle, so are also useful to include in a creatine based product.

THE SOLUTION – It should now be clear that an understanding of the GI of carbohydrates is essential information for any athlete. Athletes need to be aware of what foods are high and low GI. Once they understand this information, the following advice can be given:

1. Eat a low GI breakfast (muesli, porridge, bran flakes, wholemeal toast).
2. Eat a low GI pre exercise meal approximately 3 hours pre competition.
3. Eat high GI carbohydrates post-exercise for rapid muscle glycogen re-synthesis.
4. Eat high GI carbohydrates immediately pre and during exercise if required.
5. Eat a low GI evening meal to maintain low body fat.

4. Inappropriate weight loss strategies

THE PROBLEM – Elite athletes often strive to attain a specific body mass and composition that is usually driven by the desire to keep body fat as low as possible, whilst simultaneously maximizing power to mass ratio. This is true not only for those sports with weight classifications (e.g. combat sports, rowing, horse-racing etc), but also for endurance-based sports (e.g. road cycling) and the major team sports (e.g. football, rugby, basketball etc). In the case of the former, weight-making athletes often rely on a combination of acute, (i.e. days), or chronic, (weeks to months), weight loss strategies that are dependent on a combination of severe energy restriction (one to two meals per day) and dehydration (restriction of fluid intake, use of sweat suits, saunas, diuretics, laxatives etc).⁷ In such cases, athletes are often driven by the belief that 'less is more' where they perceive that the lower the daily calorie intake, the greater the absolute weight loss. It is of course well documented that once daily energy intake is restricted below the initial resting metabolic rate (RMR), the RMR in turn responds by resetting itself to a lower value, thus making it harder to actually lose body fat. Furthermore, reducing energy intake too low can also reduce training intensity, impair mood and lead to over-training and increased infection.⁸ In addition to energy restriction, the practice of deliberately restraining from fluid intake has obvious health concerns and in the United States, there were incidents in which 3 collegiate wrestlers died as a result of dehydration.⁷

For team sport athletes, the pre-season period is often a time when players return to their clubs with excess body fat and are immediately placed on energy-restricted diets. These interventions are sometimes underpinned by the strategy of keeping carbohydrate low, although sometimes, messages are lost in translation, and the athlete actually reverts to a zero carbohydrate diet (as opposed to low), thus leading to similar problems to those outlined above. The concept of what actually constitutes a low carbohydrate diet can also vary from athlete to athlete, as well as from nutritionist to nutritionist, and is also sport dependent (e.g. gymnasts would not need as much carbohydrate as endurance athletes).

THE SOLUTION – The process of losing weight, (and specifically body fat), is relatively straightforward and

requires the creation of an energy deficit that should be achieved by a combination of reduced energy intake and increased energy expenditure. Specific advice is outlined below:

1. Measure, (or estimate), RMR and training expenditure, either directly or indirectly, and set daily nutritional plans to at least maintain RMR.
2. Aim for a weekly energy deficit that would lead to approximately 1 kg weight loss per week (approximately a daily deficit of 1,000Kcal).
3. Educate the athlete that weight loss induced by acute training sessions are representative of fluid losses induced by sweating and not immediate fat loss.
4. Emphasise a daily diet that is based around reduced, (but not zero), carbohydrate intake. Emphasis should be on low GI and increased protein intake, (so as to increase satiety and reduce lean mass loss), with reduced saturated fat intake.³
5. Ensure that carbohydrate intake is limited in the evening periods when energy expenditure is at its lowest.
6. Where acute weight loss strategies have been adopted (such as 1-2 days or in the hours prior to weigh-in), ensure appropriate refueling in terms of both energy and fluid intake.
7. Team sport athletes undertaking energy reduced diets on training days, need to ensure appropriate fueling in the day or two preceding competition.

5. Lack of variety in the diet especially a lack of fruit, vegetables and oily fish



THE PROBLEM – Many athletes seem to stick to a meal plan that works for them which often involves eating the same meals each week. This lack of variety in the diet can lead to a lack of key nutrients. For example, many athletes avoid eating oily fish such as mackerel, tuna steaks or salmon, and as such, their diet may be lacking in omega 3 fatty acids, which are very important not only for health but also athletic performance.⁹ We have also noticed a reluctance to eat fruit and vegetables, with some athletes thinking that a multi-vitamin will suffice, or even more worryingly, think that a multi-vitamin is a better option than eating fresh fruit and vegetables.

THE SOLUTION – Coaches and sports nutrition consultants should educate athletes into the importance of eating a balanced varied diet. The reason for the lack of variety is closely linked to Mistake 6. We have found that providing athletes with smoothie recipes is a great way to get the athletes to eat more fruit, a vegetable steamer makes much tastier vegetables than over boiled school dinner vegetables and pan fried tuna

steaks are a great way to introduce oily fish into an athletes diet. Provision of fresh fruit and smoothies post-training also helps to increase intake.

6. Lack of basic cooking skills

THE PROBLEM – Many athletes leave the family home at a young age and move into either, their own home, or shared accommodation with other young athletes. In our experience this can be the cause of a classic dietary mistake – an inability to prepare and cook healthy nutritious balanced meals. We have often advised athletes that a lasagne for example is a reasonable post-exercise meal and then discovered that the young athlete is eating a budget microwave lasagne often with approximately 14g of saturated fat and less than 20% beef! This dietary mistake not only leads to poor meal choices, but can exacerbate mistake number 5. Over boiled vegetables for example, similar to what we used to get in schools, do not taste good, and it is therefore no surprise that young athletes choose to eliminate them from the diet. Many individuals appear to have a fear of cooking fish and this can lead to a lack of omega 3 in the diet. A final problem is the poor understanding of food hygiene, with many young athletes suffering from some form of food poisoning during their athletic careers.

THE SOLUTION – It is essential that sports nutrition consultants not only assess athletes' knowledge of their dietary needs, but also their ability to prepare and cook the food. In our experience, it is a great idea to enroll young athletes on a basic cooking course specific for athletes. This course should teach the athletes how to prepare food safely, how to make a variety of basic meals and importantly, how to include foods such as vegetables and fish into their meal plans. This training, if done as a group (see below), can be great fun for the athletes, whilst at the same time giving them the necessary skills to prepare a diet suitable for an elite athlete. It is important that the chef taking the course is familiar with the unique needs of an athlete - often the sports nutrition consultant will need to educate the chef prior to the training.

7. Not understanding portion sizes and macronutrient content of basic foods

THE PROBLEM – Athletes eat food. While this may sound obvious, it has implications for the way in which advice is delivered. For example, many nutrition consultants and dieticians will tell athletes to eat a meal containing 20g of protein and 60g of carbohydrates. In our experience, very few athletes would be able to convert this advice into a meal plan. This often leads to over consumption of protein and a lack of carbohydrates.

Athletes, (as well as the general public), also often struggle to understand portion sizes.¹⁰ We have dealt with many athletes who are unable to lose body fat and closer analysis suggests that their basic diet is very good and the reason for the weight gain is simply that their portions are massive. For example, a typical portion given on the back of packet of cereal is typically 1/3rd of what an athlete may eat. Also, whilst a handful of nuts may be good advice if your hands are particularly large this can lead to excessive fat intake.

THE SOLUTION – Athletes need to be given a list of foods that contain a portion of carbohydrate or protein. This list may be specific to a sport, so for example, 20g

Young Munster athletes attending a course in basic cooking skills



of protein may represent a portion or 50g of carbohydrate may represent a portion. This list should also differentiate between high and low GI carbohydrates. Athletes should never be given ambiguous advice such as a handful of nuts or a medium bowl of cereal. If in doubt, bring the food in to a meeting with your athlete and show them what you mean by a handful of nuts or a medium bowl.

8. Poor pre-competition meal

THE PROBLEM - The purpose of the pre-exercise meal is to essentially 'top-up' muscle and liver glycogen stores prior to competition, as well as ensuring optimal pre-competition hydration. Although this seems a relatively straightforward process, there are many problems associated with the pre-competition meal. Firstly, many athletes believe the pre-competition meal to be the most important meal for performance. In reality, however, the most important meals should have been consumed in the day or two leading up to the event, so as to maximize pre-competition muscle glycogen stores.¹¹ For this reason, athletes often over-eat at pre-competition, which leads to problems with digestion and absorption and ultimately causes bloating and stomach discomfort. It is crucial therefore, that this meal is consumed 3-4 hours prior to competition, so as to allow sufficient time for digestion. Furthermore, high fat (e.g. cheese, pastry, cream based sauces etc), high protein (especially red fatty meats such as steak and pork) and fibrous foods (e.g. large portions of vegetables) should also be avoided due to potential digestive problems. It has also been suggested that low glycemic index foods offer an advantage over high glycemic index foods, given their ability to offset any rebound hypoglycemia induced at the onset of exercise and also by potentially sparing muscle glycogen utilisation during exercise.¹² However, coaching staff and nutritionists should also be aware that many athletes are superstitious and have their own pre-competition routine that may not conform to sports nutrition guidelines. In such cases, it may in fact be more beneficial to leave this athlete to their own devices rather than run the risk of upsetting the athlete's psychological state prior to competition!

THE SOLUTION

1. Ensure that pre-competition meals are consumed 3-4 hours prior to the event.
2. Emphasise meals that are low GI and also low in fat and fibre based-foods (e.g. spaghetti and tomato based sauce).
3. Provide a moderate amount of protein (e.g. 10-20 g of chicken), and avoid red meat.
4. Consume at least 500ml of water/fruit juice (e.g.

- apple juice), or electrolyte based sports drinks (e.g. Lucozade Lite, Hydra 10) with this meal.
5. Consider the use of carbohydrate based snacks/drinks in the 30-60 min leading up to the event e.g. gels, drinks, energy bars etc.
 6. Experiment during non-competition so as allow for individual preferences.

9. Poor post-competition meal

THE PROBLEM - The purpose of the post-competition meal is mainly to replace muscle and liver glycogen stores, replace fluids and electrolytes lost in sweat, promote protein synthesis (and reduce protein degradation) and attenuate any immuno-suppression induced by the stress of competition. There are many factors that can determine the success of post-competition nutrition and which ultimately dictate the type of strategy that is put in place. From a logistical point of view, the facilities available at the competition site greatly affect the nutritional approach and, for the team sport athlete in particular, this is most affected by whether the fixture is home or away. From a scientific perspective, the most important factors are the energy demands of the competition itself and furthermore, the timing, quantity and glycemic index of the foods and drinks consumed (all of which we consider of equal importance).¹³

In our experience (largely from team based sports), the most common mistakes that athletes make is the conscious decision to delay post-competition feeding because they do not like to eat immediately after exercise. Furthermore, the 24-48 hours after competition is also crucial to replenish muscle glycogen stores and this becomes especially important if competition is repeated 2-3 days later. Research from soccer has supported this notion by demonstrating that when soccer players are left to their own devices, even at 42 hours after a game, muscle glycogen stores have still not returned to 100% of pre-game levels.¹⁴ In the case of the Premiership soccer player, this would be disastrous for those players who have European related fixtures within 3 days of Premiership league games. We should again stress, however, that the post-competition strategy is mainly dependent on the energy demands and competition schedule of the sport itself and as such, is highly context specific.

THE SOLUTION - The problem of poor post-competition nutrition can be overcome by educating the athlete on its importance and also ensuring an appropriate understanding of the logistical and scientific factors underpinning its delivery. In general, we recommend:

1. Providing food and drinks immediately post-competition through a variety of carbohydrate and protein rich drinks and snacks in accordance with the athlete's dietary preference.
2. Ensure carbohydrates are high GI based and ingested at a rate of 1.2 g/kg body mass. Also provide fructose-based carbohydrates (e.g. fresh fruit platter) to promote liver glycogen re-synthesis.
3. Where the energy demand has been high, ensure the athlete continues to refuel at hourly intervals for an additional 2 hours after the immediate post-competition feedings. This usually takes the form of a post-match meal, followed by further snack-based interventions.
4. Educate the player that post-competition nutrition is very different to pre-match nutrition, given that high

- GI foods are preferred to low GI foods.
5. Where protein is provided, ensure that it is whey and not casein based (in the case of drinks), and animal and not plant based (in the case of food) so as to provide an easily digestible and complete protein source, respectively.
 6. Provide electrolyte-containing drinks as opposed to plain water, so as to maximise rehydration.
 7. Where energy demands have been especially high (e.g. extra-time game), consider the use of immune-boosting interventions such as additional vitamin C, glutamine, Echinacea, probiotics etc.
 8. Where further competition takes place within 2-3 days, educate the athlete about the need for further high carbohydrate-based daily diets.

10. Over reliance on supplements and believing popular media

THE PROBLEM - Our athletes are probably sick of hearing the phrases "Supplements, not a substitute" and "You cannot supplement a poor diet" but these are 2 phrases we both passionately believe in. It never ceases to amaze us that some athletes do not realise that eating a large turkey breast fillet will give the same amount of protein as a protein shake. We are convinced that some athletes think that protein can only be consumed in expensive shakes and forget that food is by far the best way to achieve their daily requirements of the macronutrients. Whilst we accept that at times supplements are convenient, and can be an essential part of an athletes diet, we firmly believe that correct food intake must come before dietary supplementation, a view often ignored by athletes.¹⁵

Athletes should also be aware that sports supplements are a multi billion dollar industry and as such, they will be faced with inaccurate and biased information from supplement manufacturers in an attempt to boost sales. Just because a product says in the label it will "reduce body fat" does not necessarily mean that it will! Athletes MUST also be aware that some supplements have, and continue to produce positive drugs tests, either through the product being a banned substance, for example 19-norandrostenedione, a pro-hormone which is readily metabolised to the anabolic steroid nandrolone after oral ingestion, or through the contamination of non-banned supplements.

THE SOLUTION - Athletes should make every effort to gain their required macro and micronutrient intake through eating a well balanced diet. Consultation with a qualified dietician or sports nutrition consultant should help the athlete to achieve such a balanced diet. If, after implementing this diet, the athlete is still deficient in macro or micro-nutrients, or it is more convenient to consume these in a supplement, for example a protein/carbohydrate recovery drink immediately post-exercise, then the decision to use supplements should be made following consultation with a suitably qualified individual.

There are, of course, dietary supplements that are difficult to achieve from a balanced diet including creatine, beta-alanine, caffeine, vitamin D, sodium bicarbonate and taurine, which may improve performance in certain situations. Our advice for any athlete considering these is to discuss this with a qualified individual, and get individual tailored advice - supplements are not, and will never be, a 'one size fits all' approach.

Finally, we advise that athletes should ONLY take supplements that do not contain any prohibited substances and are batch tested for contamination. You can find a list of the prohibited substances on the world anti doping website (www.wada-ama.org). Many credible companies use the HFL laboratory in Newmarket to batch test their products, and information on the companies that use this service and which of their products they test, appear on the HFL website (www.hfl.co.uk). Some companies go one step further and sign up to "Informed Sport", and in doing so, the informed sport logo is displayed on the packaging of the product (www.informed-sport.com). The Informed Sport logo tells the customer that the supplements they are buying have undergone rigorous quality testing for all products prohibited by WADA. Hopefully, in the future many more companies will sign up to Informed Sport, making the selection of safe supplements much easier.

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