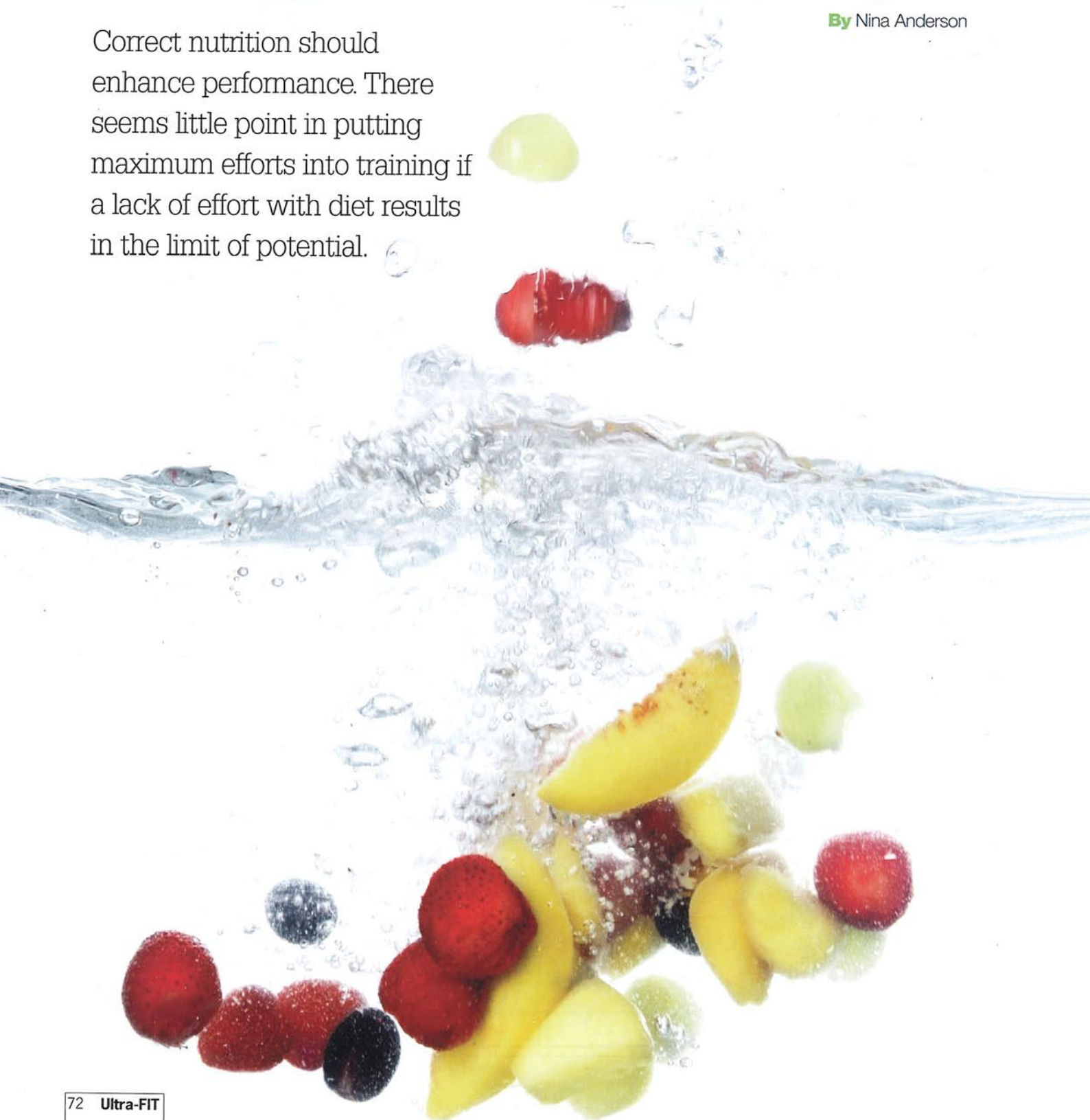


supply and **demand**

By Nina Anderson

Correct nutrition should enhance performance. There seems little point in putting maximum efforts into training if a lack of effort with diet results in the limit of potential.



In order to train at an optimal level the body needs to be supplied with sufficient fuel to meet the demands of such training. It is of the utmost importance to maintain a well balanced diet together with the correct levels of hydration. With the plethora of sport science information available, it is now widely acknowledged that there are also a number of other dietary considerations which may help to optimize performance in both training and racing.

Hydration

The body is made up of 40-70% water. This is dependent upon variants such as age, gender and body composition etc. Humans are unable to produce water so hydration has to be maintained through water ingested in the diet. A guideline for someone not taking part in sporting activities would be to drink eight glasses per day, but as water is lost in sweat and needed for innumerable bodily functions it is necessary to increase that amount for anyone who exercises. An indicator as to the required amount could be obtained by weighing oneself pre and post training. It is suggested that, for every kilogram lost $1\frac{1}{4}$ - $1\frac{1}{2}$ litres of water should be drunk to replenish that loss. Water should be drunk regularly throughout training and in sufficient quantity to avoid becoming thirsty. Thirst is not a signal that water is needed but a symptom of dehydration, and even minimal dehydration can hinder performance.

An isotonic drink is formulated to be in balance with the blood system. It may be used when an individual is training for periods of 45 minutes or more. It will supply energy in the form of carbohydrate and can help to replace sodium lost through sweat. It is therefore an effective means of re-hydration and has the benefit of providing added fuel if needed.

A hypotonic drink will also help replace salt lost through sweat. It has lower carbohydrate content than its isotonic counterpart so may be used when training for shorter periods of time, and when extra carbohydrates or calories are not required.

A balancing act

Food is our fuel and provides the energy needed for us to go about our daily activities. If there is an increase in energy requirement, as will be the case with an individual who exercises, then our diet must accommodate this. It is necessary to eat enough to ensure sufficient energy to train. A simple analogy would be that a car cannot run without petrol and a high performance car will run a great deal more efficiently with fuel of a higher quality. The same principle applies to athletes.

Carbohydrates, proteins and fats are the main food groups.

Carbohydrates (e.g. cereals, pasta, bread, potatoes, rice, fruit and vegetables) are turned into glucose when digested and transported around the body to the cells where they are then converted to energy. Over 50% of daily calorie intake should be from carbohydrates, with the majority (over approximately 45%) being from complex carbohydrates (e.g. wholegrain bread, potatoes, brown rice, bananas) and around 10% from simple sugars (e.g. honey, jam, soft drinks, sweets).

Glucose stored in the muscles and liver is called glycogen and is used as an energy source during exercise, therefore a glycogen depletion may be a limiting factor in training and racing (e.g. marathon). This is where gels and sports drinks are of great benefit as they provide carbohydrate which can be absorbed quickly and so help delay fatigue.

It is essential to replenish glycogen stores post training. Carbohydrates must be digested as soon as possible after exercise to maximize glycogen production. This can be in the form of food or recovery drinks.

Protein is needed to build and repair muscle. When a muscle works to overcome a resistance or load it undergoes microtears, which in turn stimulate the adaptation of the muscle in order that it can cope with the load next time. Protein is vital to allow these muscular adaptations to take place.

Protein is made up of different compounds called amino acids of which there are two types. Non-essential amino acids can be made by the body while essential amino acids cannot, and therefore must be obtained through dietary intake. Sources of protein are meat, fish, dairy products, pulses, nuts, seeds etc., and requirements can range from 10% to 15% of our daily calorie intake.

Fat is also a part of daily dietary requirements and provides energy (fats have the highest calorific value, a calorie being a unit of energy). They are also an important source of fat soluble vitamins A, D, E and K. They consist of two types which are saturated (usually solid at room temperature e.g. butter or lard), and are generally found in animal and dairy products e.g. beef, cheese, biscuits, or unsaturated (usually liquid at room temperature e.g. olive oil) found in seeds, mackerel, avocado etc. It is suggested that approximately 25% of daily calorie intake comes from fat.

Minerals and Vitamins are needed to ensure that the body works efficiently.

Vitamins consist of two types, fat soluble which are stored in the body and water soluble which can be found in fruit and vegetables for example. As these cannot be stored in the body it is necessary to ensure a regular supply through diet.

Minerals e.g. calcium, magnesium, potassium, phosphorous, iron and zinc are essential and they serve a multitude of purposes. For example, calcium helps in the formation of bone and teeth, iron is needed to manufacture haemoglobin which is used to transport oxygen around the body, and zinc is associated with helping to ensure a strong immune system.

To maintain a healthy balanced diet is both necessary and beneficial. It is important to eat regularly throughout the day, and taking snacks in between the three main meals will help to keep the blood sugar level from dropping. It is advisable to ensure that every meal or snack contains some form of protein and carbohydrate.

Supplements

Sports nutritionist Roz Kadir works with athletes from elite internationals to beginners, and says:-



"The question regarding the need for supplements or not is an emotive one but, in my view, a no-brainer. The quality of food today is not as good as it was 50 years ago, so even if you eat a diet that is faultless it is unlikely you will get all the nutrients you need, particularly if you are training hard as your requirements are much greater than that of a sedentary individual.

Even so, without an excellent diet free of processed food, supplements will be of minimal use. They are the proverbial icing on the cake. As a minimum, I recommend:

- A potent multivitamin/mineral supplement such as Biocare One a day Plus
- Antioxidant supplement such as Solgar Advanced Antioxidant
- Oil supplement containing omega 3 and 6, particularly Omega 3 as most of us don't get enough. A good fish oil, such as Biocare Mega EPA or Omegacare

If you are prone to get post exercise infections, then I recommend taking a Colostrum supplement and a Lactoferrin

supplement. For this I suggest Immune Care from The Winning Team Ltd.

There are many other useful supplements that can enhance training and reduce the risk of infections and injury. These are best given on the recommendation of a health professional who knows what your individual requirements are. Remember a lot depends on the distance, so if you are a sprinter your requirements are clearly different from a marathon runner.

The most popular products are: Creatine, L Glutamine, Branch Chain Amino Acids and recovery supplements containing 3:1 carbohydrate to protein.'

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The LSSA say,
'Caffeine has been increasingly used to improve the performance of athletes involved in endurance events like running, and sports that require high intensity bursts of speed. By helping you to focus better, react quicker and feel better by reducing the perception of effort and delaying the onset of fatigue vi

Caffeine

Caffeine has been used to improve performance in sport for many years with the first study dating back to the early 20th century. Caffeine seems to improve mental focus which is linked to its ability to stimulate the central nervous system. This could be beneficial in allowing an athlete to maintain focus and can help to improve reaction. It also appears to alter the perception of effort, particularly in endurance events. In short, an athlete would find a given exercise intensity to be easier and would therefore be able to work harder and so reap the benefits of the physiological adaptations which would result.

Caffeine takes approximately sixty minutes to peak in the bloodstream and this should therefore be considered when using it for training or racing.

In January 2004 it was removed from the WADA (World Anti-Doping Agency) banned list. This means that athletes can now benefit from its effects without having concerns that higher levels in the body might result in a positive drug test.

Although there are general guidelines which may be applied with regard to supplements, gels and sports drinks, as metabolic rate and tolerance can vary from person to person their beneficial effects should not be assumed. Any introduction of these products or dietary changes should be initially tried out during training. Finally, Ultra-Fit would recommend that anyone over 50 or with a history of kidney disease contemplating regular or long-term use of creatine, check first with their GP.



Nick Morgan a Sport Scientist for the Lucozade Sport Science Academy (LSSA) says, 'carbohydrate will increase creatine absorption and enhance its transport into muscle i'

Creatine

Energy is stored in cells as ATP (adenosine tri-phosphate) and is in very limited supply. When ATP breaks down into ADP (adenosine di-phosphate) it can quickly provide energy to the muscles. Creatine and phosphorous are both stored in the muscle and they bond together to form creatine phosphorous (CP). This CP bonds with ADP and turns it into the energy-providing ATP again.

Creatine occurs naturally in the diet (it is present in meat and fish) and is also produced by the body. Amounts can vary considerably on an individual basis, an example being that a vegetarian could be expected to have a lower level of creatine than a meat eater. An athlete would require approximately 2 grams per day to cope with the energy demands of training. A creatine supplement can increase the amount of creatine stored in the muscle ii. There are many studies to support the fact that creatine can improve both muscular recovery between intensive training sessions as well as athletic power and strength and so enhance performance iii iv v. Whilst it is acknowledged that more research is required on this subject many athletes are enjoying the benefits obtained from this supplement.

Update of Case Study Shân Hughes (Age - 52)



| | Initial | After 36 weeks |
|--------|---------|----------------|
| weight | 110.2kg | 106.3kg |
| % fat | 47.50% | 44.5% |

Shân has been working with nutritional therapist Glen Matten. Glen says, 'Initial analysis of Shân's case highlighted some of the perennial dietary issues that can hinder progress through an exercise regime alone, reinforcing the importance of a multi-faceted approach to achieving weight management goals.

Shân's diet, whilst by no means out of the ordinary, might be described as typical British fare. That is, the type of diet fuelling a high prevalence of cardiovascular disease, type II diabetes and obesity in the UK. Despite a pretty satisfactory intake of fresh fruit and veggies, over all the diet was tending to be high in the wrong types of fats – the saturated fats and trans fats found in such foods as chips, processed meats, cheese and processed foods.

But most telling was the high glycemic load (GL) nature of the diet. That is, a predominance of foods that release their energy very quickly into the bloodstream, triggering the release of excessive amounts of the fat storage hormone insulin. In Shân's case, a prevalence of potatoes, confectionary, sugary desserts and drinks (including sugar added to tea) and dried fruit were the main culprits.

Contrary to popular belief, a successful approach to weight management is often not quite as straightforward as it

might seem on the surface. That the diet industry has been so spectacularly unsuccessful in putting even the smallest dent in the ever-burgeoning obesity epidemic suggests that there is more to this particular problem than meets the eye. With around 95% of slimmers regaining the weight they lose (and often more besides), it suggests that the solution may be somewhat more multi-dimensional in nature than the well rehearsed 'eat less, exercise more' philosophy.



"A quick fix it isn't, but perseverance is likely to reap rewards in the long run"

For Shân, the emphasis has shifted to a diet with a low GL. That is, the type of fare that helps us feel fuller for longer and reduces cravings – fresh fruits, vegetables, oats, rye bread, beans and lentils are all good examples. Of these, an abundance of fresh fruit and veggies is key. As well as providing a veritable treasure chest of naturally occurring plant compounds that offer broad-spectrum protection against virtually all chronic degenerative health problems, they are by nature low energy density foods. That means they fill us up, provide a high concentration of nutrients but are relatively low in calories.

Reducing saturated and trans fats has also been a key facet of the nutritional programme. But don't be fooled by the bog-standard low-fat diet regimes which, despite enormous popularity don't have a great track record. For Shân, it's a case of keeping the 'bad' fats low whilst emphasising optimal amounts of the 'good' essential fatty acids found in foods such as oily fish and small amounts of nuts and seeds.

High quality lean protein is also an essential component of Shân's nutritional programme. Protein helps with satiety (helping us feel fuller and more satisfied for longer) and can help to keep blood sugar levels on an even keel. My advice to Shân was to include a protein-rich food at each meal choosing from lean meat or poultry (ideally organic or free range), game,

"The reality is that most of us are not geared to thrive on a modern Western diet paired with a sedentary lifestyle"

fish and seafood, tofu, beans and lentils, or a high quality whey protein powder used to make a breakfast protein shake.

Slavish calorie counting and excessive focus on restrictive portion control hasn't been part of Shân's nutritional programme. Bearing in mind the sterling efforts with the running programme, the emphasis has been firmly on promoting high quality nutrition not starvation. Following these principles, the emphasis has been on small but regular meals and snacks to provide optimum fuel and nourishment for body and mind.

Whilst there are many facets to Shân's nutritional programme there is one simple principle at work here. Our diets have



undergone enormous reconfiguration in the last 50 to 100 years. For millennia we evolved eating a diet high in fibre, rich in micro-nutrients and with a low GL. Typically, such unprocessed fare tended to be predominantly low energy density food, leaving us not only well nourished but feeling full and satisfied. The reality is that most of us are not geared to thrive on a modern Western diet paired with a sedentary lifestyle. For Shân, the dual approach of exercise and dietary changes brings her significantly closer to the type of diet and lifestyle which evolution designed for us to thrive on. A quick fix it isn't, but perseverance is likely to reap rewards in the long run.'

Glen Matten BA Hons Dip ION MBANT Nutritional Therapist

Glen runs a busy private practice, offers regular seminars for the general public and works with companies to improve the well-being and performance of their staff.

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The Hydro Active Women's Challenge is one of the UK's premier 5k women's road running event. It takes place simultaneously in 3 London, Liverpool and Birmingham and attracts all level of abilities www.womenschallenge.co.uk

Shân's entry into the Hydro Active Women's Challenge in Hyde Park on Sunday 16th September has given her extra motivation for training and a new focus. She is now able to run for over 50 minutes continuously and her interval sessions have improved her fitness dramatically.

Shân says, 'I am running out of road and going so far on my jogs that I will have to find new routes. The interval sessions are quite challenging but when I finish them I'm always very pleased with myself.'

Her initial programme at the beginning of the year was very basic:-

| Month 1 Week 1 | Number in brackets rest period in minutes | | | | | |
|-------------------|---|----------|-------|------|------|---|
| Mon | Tues | Wed | Thurs | Fri | Sat | Sun |
| walk | walk | walk | rest | jog | rest | Walk with dog incorporating session below |
| | | | | 8x1m | | |
| 2x4m(2)* | 2x4m(2) | 2x4m (2) | | (3) | | 4x3 (2) |

*4 minute brisk walk, 2 minute rest, 4 minute brisk walk

Progressing her training on a weekly basis, whilst trying to ensure she remained injury free was a tricky balance. It currently incorporates two quicker interval sessions, some basic conditioning and a long steady run. It is always important to try to maintain the correct balance between volume and intensity of work.

| Example of current week | | | | | | |
|-------------------------|----------------|--------------|--------------|----------------|------|--------------|
| Mon | Tues | Wed | Thur | Fri | Sat | Sun |
| REST | Treadmill:- | Run outside | X- trainer | Treadmill:- | REST | Run outside |
| | 10x1m(2)@8k/hr | 50m | 30m | 10x1m(2)@8k/hr | | 50m |
| | Conditioning | Wobble Board | Conditioning | | | Wobble Board |
| | | 5m | | | | 5m |

You can follow Shân's programme at www.ninaanderson.com/publications.shtml

This article is intended as a guide only and it is recommended that you seek the advice of a dietician or sports nutritionist.

NEXT ISSUE

In the next issue Nina explains the importance of Winter training

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Nina has a passion for athletics and fitness. She started jogging at the relatively late age of 25, and only stepped on to the track for the first time four years later. Now, at the age of 35, she is a

competitive athlete (400m and 800m). As an athletics coach she specialises in technical drills, strength and conditioning, and designing individual running programmes. Together with this, Nina works as a Fitness Mentor with a very wide range of clients. www.ninaanderson.com