

## FACT SHEET FIGHTING FATIGUE

Most people will experience tiredness or fatigue at some stage in their lives. In most cases, causes may be stress-related or simply due to a lack of sleep. Underlying medical conditions also need to be ruled out. Fatigue in athletes (recreational or elite) is often only temporary, usually caused by an increase in the amount or intensity of training. Tiredness usually disappears as the body adapts to the new workload. Fatigue also occurs during exercise and may be related to various nutritional factors, such as fuel depletion, low blood glucose (hypoglycaemia), and dehydration. However, tiredness can be a chronic condition that needs further investigation. Adequate nutrition is often overlooked as a contributing factor to fatigue. In many cases a simple change in eating habits can increase energy levels and improve performance.

The purpose of this fact sheet is to highlight and provide nutrition strategies for common dietary causes of fatigue. And while it is common for fatigue to follow in the hours or days after heavy exercise sessions, chronic lethargy should be reviewed by the individual and their sports dietitian and/or sports physician.

### SYMPTOMS ASSOCIATED WITH FATIGUE

- Elevated resting heart rate
- Drop in performance
- Increased feeling of effort
- Muscle soreness and pain
- Sudden weight loss
- Loss of appetite
- Low resistance to infection (colds/flu)
- Loss of enjoyment in training
- Sleep disturbances
- Depression

*See your doctor to check for any underlying medical conditions.*

### POOR FOOD CHOICES

Active people and athletes lead busy lifestyles and often leave little time for shopping and food preparation. Insufficient wholegrains, lean meats and dairy, and too few fruit and vegetables, along with a heavy reliance on processed snack foods, can lead to ongoing fatigue, decreased immunity and general ill health. Fad diets and nutrition supplements are temporary and do not address long-term nutritional problems. An exerciser or active person may use caffeine-containing food to suppress

fatigue e.g. coffee, guarana and cola drinks. This in itself can set up a cycle of chronic tiredness. Caffeine can interfere with sleep patterns, making it difficult to get to sleep, leading to morning tiredness and more caffeine to start the day. An Accredited Sports Dietitian can help active individuals design a nutritious eating plan that will provide the right balance of carbohydrate, protein, fat and sufficient vitamins and minerals to maximise exercise performance at training and competition and promote recovery between exercise sessions.

### THE ROLE OF CARBOHYDRATE

Carbohydrate is an important energy source for athletic performance. Carbohydrates are stored as muscle glycogen, a fuel store that must be constantly replaced. Many athletes think that they eat 'a lot' of carbohydrate but in reality are eating below their needs. For example, eating a high carbohydrate meal, such as pasta the night before competition, does not necessarily mean that the athlete is consuming sufficient carbohydrate to fuel their needs. An individual's carbohydrate intake needs to reflect their daily training and exercise load. Use the table below to calculate your own fuel needs.

Training Load	Carbohydrate (CHO) Requirements	Example 70kg Athlete
Light and/or skill based training	3-5 grams CHO per kg/day	210-350g/day
Moderate (~1hour of low to moderate intensity)	5-7 grams CHO per kg/day	350-490g/day
Elite endurance athletes on heavy, strenuous training programs	7-12 grams CHO per kg/day	490-840g/day

*See additional fact sheet: Eating and drinking before sport*

Chronic low carbohydrate intake combined with regular training can result in gradual depletion of glycogen stores and lead to a feeling of prolonged fatigue. Alternatively an increase in training load or exercise can result in a loss of appetite. Depleted muscle glycogen can lead to muscle heaviness and a lack of energy to train, particularly at high intensities. The individual may even 'hit the wall' and be unable to complete their training session.



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Most people store enough glycogen for 90-120min of continuous exercise; however eating too little carbohydrate can significantly reduce this time. An athlete low in glycogen needs a reduction in training intensity, or several days' rest, as well as an increase in carbohydrate to replace glycogen stores.

Very low carbohydrate diets can ultimately lead to chronic tiredness, low muscle glycogen and loss of muscle mass. Some athletes claim to feel less fatigued when first on these diets. This may be because: a) their previous eating habits were worse than the new diet; or b) they obtain a psychological boost from the diet. As carbohydrate is also needed to fuel the brain, low carbohydrate diets can result in poor concentration, depression and mood swings. For additional information, see our fact sheet on Low carb diets for weight loss in athletes.

### TIMING OF CARBOHYDRATE

Timing of carbohydrate is very important for muscle recovery, especially when training twice a day. After moderate to high intensity exercise, muscle doesn't start replenishing glycogen at a high rate until carbohydrate is eaten, so effective recovery only starts after eating a carbohydrate based snack or meal. 1-1.2 grams of carbohydrate per kilogram of body weight (i.e. 70-84g in a 70kg person) within the first hour after completing exercise is needed to kick-start optimal fuel recovery (see Table 1). This is most important when there is only 4-8 hours between exercise sessions. If there is longer time between training sessions, then total carbohydrate intake over the whole day is most important.

### LOW ENERGY CONSUMPTION

Many active people have hectic schedules and simply don't eat enough during the day. Athletes are faced with the additional challenge of eating to meet the energy needs of training. Those with a large lean body mass, high training loads or who are growing or trying to increase muscle mass may struggle to eat sufficient food. Hunger is not always an ideal guide as exercise can suppress appetite. Growth spurts in the adolescent years can also lead to ongoing tiredness, particularly in active adolescents. Having energy rich foods and drinks available during and after exercise is important to meet additional needs (see Table 1).

Table 1: Examples of nutritious recovery foods (50g carbohydrate and 10g protein)

250-300ml smoothie or liquid meal supplement
60g breakfast cereal with ½ cup milk
1 banana with 200g yoghurt
Meat/Chicken and salad roll with 1 piece of fruit
250g baked bean on 2 pieces of toast
300ml flavoured milk, cereal bar and piece of fruit

Conversely, some athletes restrict their kilojoule (or calorie) intake to maintain a low body weight for their sport (e.g. gymnasts, dancers, rowers). Many female athletes do so to control their weight and body shape. Low kilojoule diets can eventually lead to a constant feeling of fatigue due to the body having to survive on too few kilojoules, vitamins and minerals. (See our fact sheet on Body fat control and making weight). True nutrient deficiency diseases are not common, but individuals can suffer sub-clinical symptoms like lowered immunity, decreased strength due to loss of lean body mass, impaired bone maintenance, and poor recovery between training sessions. Athletes on lower energy eating plans may need to choose foods that are nutritious (high in vitamins and minerals) and promote satiety (where hunger is quickly satisfied).

### DEHYDRATION

Many individuals do not drink enough fluid to replace their sweat losses and as a result are chronically dehydrated. Dehydration impacts on exercise performance and may reduce decision making ability and skill level. Cramping during exercise may also be a result of dehydration, although salt concentrations in the body and training load are other major factors in this condition. Possible signs of ongoing dehydration are general lethargy, which is worse in hot weather, dry skin, headaches, nausea and an inability to concentrate. One way to monitor fluid status is to measure body weight on a daily basis and take note of urine volume and colour (see Fluids in sport). Strongly coloured urine, a small output over the day, and large weight fluctuations from one day to the next can indicate poor attention to hydration. Athletes/active individuals are often encouraged to drink at training, but forget about consuming fluid throughout the rest of the day. Including a drink with every meal and snack will assist with daily fluid needs. Remember that fluid requirements will be greater in hot weather, if there is an increase in training intensity or duration, or after long aircraft flights. Individuals with high sweat rates should be particularly careful about meeting their fluid needs.

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### IRON DEFICIENCY

Athletes are prone to iron deficiency due to blood loss in sweat, urine and faeces. Females also have increased losses due to menstruation, while those involved in contact sports can have regular injuries that result in bleeding. Drugs such as anti-inflammatories can cause gastro-intestinal bleeding, which also increases iron loss. Endurance runners are also prone to iron deficiency due to *footstrike haemolysis* (the mechanical damage that occurs in red blood cells as they pass through the capillaries of the foot during the footstrike phase). Coupled with that, poor diet and/or food avoidances will result in low iron intakes, particularly in females and vegetarians. Iron needs are 1.3-1.7 times higher of athletes than non-athletes and 1.8 times higher for vegetarians than meat eaters. Low iron stores are more common than clinical iron deficiency anaemia, which results in symptoms such as extreme fatigue and shortness of breath, to the point where the athlete simply cannot exercise. Low iron stores can result in a more general tiredness with an increase in recovery time, poor immunity, cold-like symptoms and depression. A blood test is used to determine iron status. As readings such as haemoglobin and ferritin can be affected heavy training, it is often difficult to assess from a single blood test whether iron stores are low. Monitoring of changes to iron levels with consideration of symptoms and risk factors will give a better picture of whether insufficient iron is the cause of fatigue. A sports dietitian can alter an athlete's food intake to optimise iron intake. (See additional fact sheet: Iron depletion in athletes).

### VITAMIN AND MINERAL SUPPLEMENTS – THE CURE FOR FATIGUE?

There is a widely held belief that our food supply is deficient in most nutrients due to poor soil and processing techniques. Many supplement companies claim this is the reason why we should take supplements. However, nutritional analysis of Australian foods shows this is not the case. Fatigue and ill health is more commonly caused by an imbalance of carbohydrate, protein and fat. Taking a supplement will do little to reverse this problem beyond giving a psychological boost. Of course, if a vitamin or mineral deficiency is clinically diagnosed, taking a supplement may be necessary to rectify this. A broad spectrum multivitamin and mineral may also act to protect those who are travelling and cannot eat their normal meals, or have to limit their food intake to reduce their weight. Elite athletes with a heavy competition schedule and disrupted meals may also benefit from a broad spectrum multivitamin and mineral supplement.

### SUMMARY – REDUCE YOUR RISK OF FATIGUE

- Eat for health: include plenty of wholegrains, fresh fruit and vegetables, lean protein sources, dairy products and healthy fats.
- Avoid fad diets and those that eliminate carbohydrates or whole food groups (e.g. “no dairy” diets).
- Be prepared for eating on the run and after exercise. Sandwiches, rolls, smoothies, flavoured milks, yoghurt, fruit and cereal/sports bars are some of the better food choices
- If you are vegetarian, include meat substitutes like nuts, seeds and legumes.
- Don't be obsessed with eating 'good' foods, avoiding anything containing fat, or limiting your total fat intake to 20g or less per day.
- Ensure you are well hydrated every day. Work out your sweat rate (see Fluids in Sport) and develop your own drinking plan.
- Constant travel can wear you out. Plan your ventures and take your favourite foods such as cereal, sports drink, liquid meal supplement, dried fruit and nuts, cereal or muesli bars and sports bars.

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